REALISTIC PHILOSOPHY

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REALISTIC PHILOSOPHY

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PHILOSOPHIC SERIES

BY

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GENERAL INTRODUCTION.

WHAT AN AMERICAN PHILOSOPHY SHOULD BE.

America has arrived at a stage at which there is a body of men and women who have leisure and taste to cultivate the liberal arts and advance the higher forms of civilization. She does not claim to have accomplished in a century or two what Europe has done in twice that time. It would not be just to require her, as one country, to be doing as much as all the countries of the Old World are doing. Still, she now ranks with any other one nation in literature, science, and art. She has a literature which promises to rival that of England. Her historians, in respect both of research and style, are equal to those of Europe. She has not yet produced a poem of the highest class, such as the *Iliad*, *Æneid*, the *Inferno*, or *Paradise Lost*, or *Faust;* but some of her poets in this past age may be placed on the same level as any of their contemporaries. She can show statues and paintings (in landscape, for example) full of vigor and freshness. She has humorists, not perhaps of the highest order—they are too much given to startle by exaggeration—but with a manner of their own. Franklin, Thompson (Count Rumford), and Joseph Henry have led the way in original scientific research, and there are

professors in our colleges pursuing the most advanced science. In "practical inventions," called forth by the necessities of the wide country, she is in advance of all other people.

But all enlightened nations have also had a philosophy bent on inquiring into the reasons of things and settling the foundations of knowledge. India and Persia had it in very ancient times in the form of a theosophy. Greece, followed at a distance by Rome, sought to establish the reality and penetrate into the nature of things. France has had a philosophy ever since the days of Descartes, in the seventeenth century, and so has Germany since the time of Leibnitz in the following age. The English have had a most influential mental science since the time of Locke, and Scotland has since the days of Reid. Italy, at this present time, has a promising school.[1] How does America stand?

She has had a considerable number of able philosophic thinkers. It may be doubted whether any country has had a more acute metaphysician than Jonathan Edwards, whose views were restricted, and who was kept from doing more, simply by his want of books, and of collision with other thinkers. The theologians of America have made constant use of philosophic principles in defending their doctrinal positions; but the thinking people have not formed a separate school, as the French, the English, the

[1] See an account of this school, by Luigi Ferri, in Princeton Review, (55th year). Mamiani, who had so fine a Platonic spirit, is now dead, but it is hoped that La Filosofia della Scuole Italiane, of which M. Ferri is now sole editor, will take a lead in this school. I may mention that his book, written in French, La Psychologie de l'Association, shows historically and critically that Association of Ideas cannot account for our high intellectual and moral ideas. It is the ablest work on this subject.

Scotch, and the Germans have. In the last century and the earlier part of this, they followed Locke or Reid, one or both, always making an independent use of what they adopted—as a rule they took from Locke only what was good, and carefully separated themselves from his sensational tendencies. In this past age our thinking youth have been strongly attracted by Kant and his school, some of them being caught in the toils of Hegel. In the present age a number are following John S. Mill, Bain, and Herbert Spencer. All this, while we never have had a distinctive American philosophy.

The time has come, I believe, for America to declare her independence in philosophy. She will not be disposed to set up a new monarchy, but she may establish a republic confederated like the United States. Certainly she should not shut herself out from intercourse with other countries; on the contrary, she should be open to accessions from all quarters. But she should do with them as with the emigrants who land on her shores, in regard to whom she insists that they speak her language and conform to her laws; so she should require that her philosophy have a character of its own. She had better not engage in constructing new theories of the universe spun out of the brain. The world has got sick of such. Even in Germany, where they summarize, expound, and critically examine all forms of speculative thought, they will not listen to any new philosophical systems, and the consequence is that none is now offered—the latest being pessimism, which startled young thinkers by its extravagance, and by its containing an element of truth in bringing into prominence the existence and prevalence of evil which the philosophy of last century had very much overlooked.

But what is to be the nature of the new philosophic republic formed of united states? All national philosophies

have to partake of the character of their nation. The philosophy of the East was sultry and dreamy—like the Indian summer. The Greeks used a dialectic, sharp as a knife, and separated things by analysis and combined them by intellectual synthesis. The French thinking excels all others in its mathematical clearness imposed upon it by Descartes. The English philosophy, like Locke, is characterized by profound sense. The Scotch is searching, anxiously careful and resolute in adhering to observation. The German has a most engaging *Schwärmerei*, and is ever mounting into the empyrean, its native sphere, in which it is seeking by criticism to construct boundaries. If a genuine American philosophy arises, it must reflect the genius of the people. Now, Yankees are distinguished from most others by their practical observation and invention. They have a pretty clear notion of what a thing is, and, if it is of value, they take steps to secure it.

It follows that, if there is to be an American philosophy, it must be Realistic. I suspect they will never produce an Idealistic philosophy like that of Plato in ancient times, or speculative systems like those of Spinoza, Leibnitz, and Hegel in modern times. The circumstance that Emerson is an American may seem to contradict this, but then Emerson, while he opens interesting glimpses of truth, is not a philosopher; his thoughts are like strung pearls, without system and without connection. On the other hand, the Americans believe that there are things to be known, to be prized and secured, and will never therefore look approvingly on an agnosticism which declares that knowledge is unattainable. The American philosophy will therefore be a Realism, opposed to Idealism on the one hand and to Agnosticism on the other.

Realism.

It holds that there are real things, and that man can so far know them. But if there are things and we know them, we must have a capacity to know them directly, of course having also the power of adding indirectly to our direct knowledge. We cannot by legitimate reasoning infer the existence of mind or matter from a datum or premise which does not contain the existence of mind or matter—the addition or multiplication of 0 can never give us anything but 0. We shall see that Hume made us start with mere impressions or ideas, and thereby, of purpose, landed us in scepticism or what would now be called agnosticism; and that Kant started with phenomena, in the sense of appearances, and tried from these to reach things, but utterly failed to extract reality from what had no reality. If we are ever to get hold of reality, we must seize it at once.

Realism holds that the mind perceives matter. In sense-perception we know things; we know them as external to the perceiving self—as extended and exercising resisting power. We have no need to resort to such theories as those of intermediate ideas or occasional causes coming between the perceiving mind and the perceived object. All of these were brought in to remove supposed difficulties which do not exist, and have only introduced real difficulties.

While we adhere resolutely to the doctrine of natural realism, namely, that the mind knows matter directly, there is room and reason for doubt as to what is the thing perceived directly by the senses generally and by each of the senses. The mature man is apt to think that he knows by directly looking at it the distance of that mountain, and yet it has been shown that all that he knows im-

mediately by the eye is a colored surface, and that he knows the distance of objects by a process of reasoning proceeding on a gathered observation. There is still need to inquire what is the matter we originally perceive, whether it is our bodily frames or objects beyond them. It seems to me that our early perceptions are mainly of our organism; say by taste of our palate, by smell of our nostrils, and by touch proper of our extended frame. I think it probable, however, that by the muscular sense and by the sight of eye, as higher senses, we know objects as external to our body but affecting our body. But there is need of farther experimenting to determine what matter each sense perceives, how far out of or how far in the organism. On this subject, which is a very important one, the experiments and observations of certain German physiologists, such as Lotze, Helmholtz, Wundt, Fechner, also Professor Stanley Hall and Doctor Starr, will throw light. Meanwhile, we must resolutely hold that in the farthest resort the mind perceives matter, whether in the body or out of the body, as external to the mind, extended and resisting energy.

We should hold still more resolutely that we have an immediate knowledge of self in a particular state. By this I do not mean that we know Self apart from a mode of self: the self is under a certain sensation, or is remembering, or thinking, or deciding, is in joy or in sorrow. Certainly we do not know the self aloof from the sensation or some other affection, but just as little do we know the sensation except as a sensation of self; nor a sensation without a sensitive object, nor a sensation in general, nor a sensation of another, but a sensation of our own.

Realism farther maintains that in Memory we know things as having been before us in time past, and do thus know Time as mixed up with the event in time from

which it can be separated by an easy process of abstraction. In this we know Time to be as real as the event in time.

In contemplating Space and Time we are led to look on them as without bounds, and thus rise to such an idea as the mind can form of Infinity.

In knowing objects we perceive that in the very nature of the things there are relations involved such as that of Personal Identity, of Substance and Quality.

We have still higher knowledge. We know certain voluntary acts as being Morally Good or Evil, say as being just or unjust, benevolent or cruel, candid or deceitful. Not that this moral good discerned by us is the same kind of thing as body or mind, or has the same kind of reality. Still it is perceived as a reality in voluntary acts known in consciousness. I am inclined to argue that by the conscience the mind perceives voluntary acts to be free. Philosophy should not attempt to prove this by a process of mediate reasoning. Mind perceives matter at once; but it also perceives benevolence, and perceives it to be good, as clearly as the eye perceives objects to be extended. It is the business of philosophy not to set aside these realities, but to assume them and justify the assumption; and to endeavor—what is often a difficult work—to determine and express their exact nature.

In doing this, philosophy proceeds by observation and according to the method of induction, the observation being made by the consciousness or internal sense. It should decline to proceed in the old Greek method of analysis and synthesis, or of deduction and reasoning. It should refuse with equal decision to proceed in the method of Kant by a criticism, liable itself to be criticised by a farther criticism carried on without end, without a foundation of facts to settle the questions stirred. It is the office of metaphysics to find out what the facts immedi-

ately perceived are and enunciate them as first and fundamental truths. Not that it is our observation or induction of them that makes them realities or truths; the correct statement is that philosophy observes them because they are realities.

Obvious objections present themselves to this mode and style of thinking. These can be answered, and they should be answered. First, it should be noticed that our observation does not make the propositions true; we perceive them because they are true. Secondly, we have to call attention to the important distinction between our original and acquired perceptions, and be ready to defend the original ones if assailed; but we are not bound to stand up for all the additions by human thinking. Our intuitive convictions carry with them their own evidence and authority, the others may be examined and criticised, may be proved or disproved. Thirdly, a distinction should be drawn between our sensations proper and our perceptions proper, the former being mere feelings of the organism, which may be misunderstood and misrepresented, the latter only being the cognitions of realities. Fourthly, there is the distinction, often very loosely drawn, between the primary and secondary qualities of matter. The former are energy and extension perceived directly and in all matter, the latter a mere organic feeling or sensation, such as heat as felt, implying an external cause, which is shown to be a molecular motion. Fifthly, there is a distinction between different kinds of realities. There is a certain kind of reality involved in our perception of body as extended and impenetrable. There is also a reality, but of a different kind, in the perceiving of self in a certain mode, say as thinking or willing. The one reality is as certain and definite as the other, but it is of a different kind and is perceived by a different organ, by self-con-

sciousness and not the external senses. There is a third kind of reality in the object perceived by our conscience or moral perception. It is quite as certain that hypocrisy is evil and that truthfulness is a virtue as that body exists or mind exists; but the one is a separate thing known, whereas the other is a quality, a quality of mind, quite as certainly existing as mind itself.

These distinctions are not difficult to comprehend. They are very generally known and acknowledged. But they need to be carefully applied to our cognitions in order to defend first truths and a thorough-going realism.

It will be found that in proceeding on this method we meet with far fewer difficulties than on any other. There is a mode of discovering and testing truth often resorted to, and this successfully in the present day, which I am willing to use in the case before us. Let us begin, it is said, with adopting the doctrine we are seeking to establish as a working hypothesis, and inquire whether it explains all the facts; and if it does, we may regard it as an established law. Let us then adopt realism as a working hypothesis, and inquire how it works, and we shall find that it unravels many perplexities and is encompassed with fewer difficulties than any other doctrine; that by it the real difficulties which present themselves may all, or nearly all, be met and removed, and that realism is consistent with all other truths and throws light upon them. Adopt any other theory, say idealism, and make the mind add to things as it perceives them, or phenomenalism, which makes us know mere appearances, or agnosticism, which makes things unknown, and we shall find ourselves ever knocking against obstacles which cannot be removed, against intuitive convictions which insist on our listening and submitting to them, or against obstinate facts facing us as rocks. Adopt realism, and we shall discover that

we have a clear way to walk in. But in order to this our doctrine must be thorough-going. If we resort to compromises, or make weak admissions, we are entangled in difficulties from which we cannot extricate ourselves. If, for instance, we take the position that some of our intuitions or natural perceptions look to realities while others are deceptive or contain only partial truth, our inconsistencies will greatly trouble and weaken us. The sceptic will ask, if one of our primitive perceptions may deceive us, why not all, and we can answer this only on principles which will undermine them all, and leave us in bottomless agnosticism.

It can be shown that the inquiries of the Greek philosopher were after realities; not for the absolute, which is the search of the modern German philosophies of the higher type, but for τὸ ὄν or τὸ εἶναι, phrases which should not, as they often are, be translated absolute. The Greeks saw that there were appearances without realities, and that appearances were often deceptive. Some of them, such as the Eleatics, came to adopt the maxim that the senses deceive, and appealed from them to the reason, forgetting that the reason has to proceed on the matter given it, and if this is erroneous the reason which rests on it may give erroneous decisions. Aristotle was the first to establish the grand truth that the senses do not deceive, and that the errors arise from the wrong interpretation of the information given by the senses. By the help of the distinctions drawn by him, and since his time by the Scottish school and others, we can stand up for the trustworthiness of the senses, and do not require to call in to our help "ideas" with Locke, or "impressions" with Hume, or "phenomena" with Kant; and we may follow our natural convictions implicitly, and regard the mind as perceiving things immediately, and run no risk of deceptions or contradictions.

Idealism.

Idealism in thought and in literature is altogether of an ennobling character. But we are to speak of it here as appearing in speculative inquiry. As a philosophic system it holds that the mind out of its own stores always adds to our apprehension of things.

It may be a thorough-going idealism, such as that of Berkeley, who maintained that by the senses we perceive not material things extended and made up of particles but ideas created by the Divine Mind, and that things exist only as they are perceived. Fichte went to a greater extreme, and held that things are the projections of mind, of the individual mind, or rather of that incomprehensible fiction of the philosopher's brain, the universal ego or consciousness. But by far the greater number of the systems of idealism have been partial and one-sided. Locke was practically a decided realist, believing both in mind and matter; but he holds that mind perceives bodies, not directly, but merely by ideas supposed to be representatives of bodies. Kant speaks of the mind beginning with phenomena, in the sense of appearances, and then tries illogically, I think, to argue the existence of things, which however, he (followed by Herbert Spencer) represents as unknown. Berkeley, coming after Locke, urged that if we can perceive only ideas, we cannot from these argue the existence of material things, the ideas being themselves the things and sufficient. Fichte, coming after Kant, defied any one to prove from mere appearances the existence of a reality beyond, as this would be putting in the conclusion more than is in the premises. Ever since, the German metaphysicians of the higher sort have been pursuing realities, and in thinking that they have caught them have only embraced a cloud. If we do not start with

realities, both in the object perceived and the perceiving mind, we can never reach them by any legitimate logical process.

The half-and-half systems, the ideal-real as they are called, held by so many in the present day in Germany, are in the position of a professedly neutral person between two hostile armies, exposed to the fire of both. On the one hand it is argued that if one part of our native and original perceptions be ideal, why may not the other parts, why may not the whole be so? If the balloon without any weights attached be let loose, it will move as the winds carry it, and cannot be brought down to the solid earth except by a collapse. On the other hand it is argued by the agnostic that if all or so much be created by the imagination we have no warrant for asserting that there is any reality, and we must sink into the slough of nescience and nihilism, which are the same nonentities viewed under different aspects; the one asserting that man has no capacity to know, and the other that there is nothing to know, and both culminating in the absolute blank of agnosticism, which is darkness which cannot be seen, for there is no eye to see it—the darkness of the sepulchre, in which death ends all. But are we in the narrowness of our realism to exclude the ideal? This would be like depriving the flower of its perfume. The imagination is one of the loftiest powers with which our Maker has endowed us. The child with the aid of its doll and other toys weaves its tales of weal or woe and takes a part in them. The mature man has his day-dreams as well as his night-dreams, and in the midst of the hard struggle of life pictures better days to come. The Christian dies gazing into the invisible world as if it were visible. Take away the ideal, and literature would be stripped of half of its charms. Even science cannot do without it. "The

truth is," says D'Alembert, "to the geometer who invents, imagination is not less essential than to the poet who creates." In the mind of Newton gravitation was a hypothesis before it became an established law. Philosophy without the ideal would be shorn of the halo which it has in Plato and Leibnitz, and could not mount to heaven, which is its sphere. All our higher thought goes out into infinity. The real without the ideal would be like the earth without its air and sky.

Idealism has a wide sphere lawfully allowed it, but it must not be permitted to break out of its orbit. We give it a place, a high place, but we keep it in its place, and we should not allow it to evaporate into nonentity. By all means let us have fancies in our spontaneous thinking. But we are here speaking of philosophy, which is reflective thinking. It is one of the most important offices of philosophy to announce to us the grounds on which we believe in *what is* in opposition to *what is not*, and in doing this it has to define what field the ideal has as distinguished from the real; it has to show us how fancies differ from facts. It will not discourage the soaring into the imaginary, but it requires that all the while we know and acknowledge it to be imaginary. The man who believes in the existence of unreal objects is a madman; the speculation, wild as a romance, but not so attractive, which makes the ideal real is equally lunatic.

Idealism is in itself a noble product. God has clothed the world with beauty of form and color, with loveliness and grandeur. He has farther given us the power of distributing these in an infinite variety of ways on objects that are without them. This is the rich field which poetry and art hold as their own possession. But surely no one would give ideality a place in science as science. Newton discovered gravitation, which is in itself a bene-

ficial law, but he did not seek to add to its bountifulness by imparting to it qualities devised by his own constructive imagination. Mayer established the doctrine of the conservation of energy, which keeps the world in stability, but he did not try to embellish it or make it stronger than it is. Idealism has no place in philosophy any more than it has in science. Philosophy will never be properly established till this is acknowledged. Its business is to discover, determine and settle fundamental principles without adding to them or subtracting from them. When science and philosophy have unfolded the true wonders of nature, imagination may construct out of them a lofty ideal system.

It has been shown that all our imaginations are simply reproductions, in new forms, of our experiences. A giant is a man enlarged. A dwarf is a man diminished. The consequence is that the larger our knowledge the wider the circumambient region of fancy in which we may fly. In modern times, with our larger knowledge, historical and scientific, we have a more varied field for the fancy, if we would use it, than the ancients. The atmosphere is an essential part of our earthly abode, and what diversified action does it show as it raves in the storm and soothes us in the gentle breeze, as it displays such clearness in the morning and such a glow in the evening! But, after all, it is held in its place by gravity, as the solid earth is; so our very highest flights of the mind are ruled by law. The flower needs its stalk, and the leaf its branch. The bird with its wings can fly, as I have seen, a thousand miles across the ocean; but it starts from solid ground, and lands at last on a ship or island. The mists are beautiful when and only when they form a veil to the mountains whose grandeur they at once reveal and conceal, showing us so much, and tempting the curiosity to look into what is hid beyond.

Agnosticism.

Extremes meet, as the east and west do in lines on our globe. Idealism leads logically and historically to Agnosticism, for, if portions of our original knowledge be ideal, that is imaginary, why may not all be? And if all be so, we are down to Nihilism. Locke's philosophy, partly idealistic, became wholly so in Berkeley, and sunk into nescience in Hume, and continued so in John S. Mill and his school. Kant's phenomenal theory of knowledge, and his forms imposed by the mind on things, are the places of refuge to which Agnosticism retreats when it is pressed.

It should be noticed of Agnosticism that it is seldom or never consistently carried out. Its supporters maintain that we cannot have a knowledge of reality. But they act and speak and write as if there are things. They believe in the existence of some things—they commonly believe in the existence of meat and money. They are convinced of the reality of things that are seen; they begin to doubt and deny only when we press spiritual truth upon them, when we show them that there is an immutable morality, that there is a God, and that this God will call them to account.

The common way of meeting Agnosticism is by showing that it contradicts itself. It is obviously a contradiction to assert that we know that we can know nothing. But when we have proved this, we have only strengthened the opinion we are opposing. One of Hume's strongest sceptical arguments is that our vaunted knowledge is inconsistent, that reason lands us in contradictions. The most effective way of leading us to abandon our assurance of reality is to demonstrate that in pursuing different lines of thought we reach opposite and inconsistent conclusions. The only satisfactory and conclusive way of meeting Ag-

nosticism is to follow the realistic method we are recommending in this paper, and to show that we have a primitive knowledge which we spontaneously proceed upon, and which we ought to assume in philosophy.

In the present day the Americans are still depending on the Europeans, and borrowing from them. The more earnest students go to Deutschland, and are ploughing, as Ulrici used to say, with the German heifer. Others, who are more addicted to the observations of sense and the methods of physical science, are taking what philosophy they have from Professor Bain and Mr. Spencer, and may be called the Modern English School.

The German School.

The American youth of the present day who wishes to carry on research goes for a year or more to a German university. In particular, those of a metaphysical taste do not feel that they have enough to satisfy them at home, and they betake themselves to Berlin or Leipsic to get a full supply of the food for which they crave. On entering the lecture-rooms there they find certain formidable distinctions proceeded on without being explained—such as those between object and subject; à priori and à posteriori; rational and empirical; real and ideal; phenomenon and noumenon—all of which may involve a concealed error with the truth which they convey, namely, making objective truth subjective, or the creation of the mind. As they go on they find themselves in a labyrinth, with no clew to bring them out into the open air and light.

All these distinctions have had the mark of Kant branded upon them. That powerful thinker has taken possession of the philosophic thought of Germany more

effectively than Plato did that of Greece, or Aristotle that of the Middle Ages, or Locke did that of England, or Reid and Hamilton did that of Scotland—he rules over the minds of the Germans as determinedly as Bismarck does over their political action. Some, such as Fichte, Schelling, and Hegel, have been carrying out certain of his principles to greater heights of idealism. Younger men, feeling dizzy on the elevations to which they have been carried, insist on being carried lower down, and have raised the cry, "Back to Kant," thinking that they may stop in the descent where he stopped, but find that by the weight upon them they can get no resting-place short of the bogs of agnosticism. All are alike entangled, even Helmholtz and the physicists, in the nets of the critical philosophy from which they cannot extricate themselves.

We have come to a crisis when of all things it is necessary to criticise the critical philosophy. I have been taking exception to certain of the positions of the great German metaphysician. I have all along maintained what Dr. Sterling seems now to be establishing, that Kant did not satisfactorily meet Hume, the sceptic. On the contrary, he yielded to him certain grounds on which he erected a scepticism as deadly as that of the cold Scotchman, but much more alluring. First, he proceeded in a wrong method—in the Critical—which has started a series of criticisms with no ultimate ground of fact to rest on, instead of the Inductive, which, it should be understood, does not give cogency to first truths, but simply discovers them. Secondly, he started not with facts, but with phenomena, in the sense of appearances, and from these could never logically rise to realities. Hume began with impressions and ideas from which no one could ever draw things; and for these Kant substituted unknown presentations, from which we cannot extract realities any more

than we can extract light from cucumbers. He has built a formidable castle in the air, to which agnosticism retreats when it is attacked. Thirdly, he maintains that the mind perceives objects under forms which are not in the things, and has thus created an ideal world, to which poets such as Goethe and Schiller delighted to mount, but which affords no secure abode to those who insist on having on earth a solid domicile in which to dwell.

In the last century Locke was the most influential of all philosophers. It has taken a long time to separate the error from the truth in his system. In order to this it needed the profound examination of Leibnitz in the last century, and the brilliant criticism of Cousin in this; it has required, further, the practical sense of Reid and the Scottish school to expose his ideal theory, and the glow of Coleridge to attract the eyes of men to something higher than sensations. Locke's error in supposing that the mind perceives ideas and not things, and in deriving all truth from a limited experience, are clearly seen, and we need now only to accept the great body of truth which he has established forever.

Kant holds in the nineteenth century the place which Locke did in the eighteenth. We need now to have him examined as searchingly as Locke has been. The wave which carried Kant's philosophy to its greatest height crested at his centennial in 1881, and will now fall down to its proper level. His system will be stripped of its fictitious features, that we may receive and welcome the great body of truths which he presents.

For myself, I can scarcely regret the exclusive authority which Aristotle exercised for a thousand years, for he has thereby, through the mediæval logic, modelled modern notions into their present shape—even as the ocean by its agitations has moulded the pebbles and sands which

bound it. But it was necessary for the advancement of thought that the Stagirite should be dethroned from his too exclusive power by such original thinkers as Bacon and Descartes. In like manner the influence of Locke has been for good, but we rejoice that Reid exposed his theory of ideas, and showed that he had overlooked truths of primary reason. So, while we do not grudge to Kant his reign for a hundred years, we may earnestly wish that his whole philosophy be now subjected to a kindly but rigid criticism, in which the true and the good are retained, namely, first truths prior to experience, while the false and evil are cast off, namely, all that is inconsistent with a thorough-going realism.

The Modern English School.

It consists of writers who have drawn their philosophy from Locke through Hume. The most eminent representatives of the School are, first, Mr. J. S. Mill, then Mr. Lewes, who brought in an element from Comte, the positivist, and Mr. Herbert Spencer, who has called in the development power, and Professor Bain, who has sought to combine physiology with psychology. The American philosophy must be ready to accept from all these men valuable observations made by them both as to psychical and nerve action—we may borrow from these Egyptians the materials wherewith to build our tabernacle; but we must superadd higher and spiritual truth to give it a form and meaning. The whole school is guilty of great oversights which require to be supplied. They commonly state correctly the physiological facts as made known by the senses and the microscope, but they overlook a great many of the psychological facts quite as clearly revealed by the internal sense or consciousness. They give us the

husks, but do not open to us the kernel. We may specify some of their defects, leaving others to carry on the work.

1. There are oversights in their view of the exercises of the Senses; not of the bodily organs, but of the mind or intelligence as operating in perception by the senses. They have not seen or acknowledged that in sense-perception there is knowledge, in fact, our primary knowledge; our knowledge of things as extended, and as having resisting power—the beginning of the idea of power. They have commonly been satisfied with representing the mind as starting with impressions (that vaguest of terms) or sensations from which they can never get the knowledge of things.

2. They have not seen that in Consciousness, meaning Self-consciousness, they have a knowledge of *self* in some particular act, say perceiving, remembering, judging, or resolving, all of which we know as acts of *ourselves* and not of another. The school speak of the mind as itself unknown, the qualities only being known, whereas the qualities are abstractions from a thing known, known as exercising the qualities. The knowledge of self as conscious, along with the knowledge of a not self as external and extended, is the beginning of all our knowledge. All our other cognition presupposes this and proceeds upon it. This knowledge is of real things, and all knowledge legitimately built upon it is also of realities.

3. The whole school give a defective account of what is involved in the Memory. They make it a mere reproduction of the past. There is, first, they say, a perception of an object, say a mountain, and then a reproduction of this perception. But this is not all that is involved in memory. In remembrance there is not only the image of the object, but a recognition of it as having been before the

mind in time past. This implies a Faith element and the idea or knowledge of Time which metaphysicians have had such trouble in dealing with.

4. They do not acknowledge or see what lofty exercises are involved in the Imagination, which creates the ideal out of the real, and ever tends toward what it may never be able to reach, the Infinite. In these operations the mind rises above the senses into a higher sphere, where the philosophers of the senses do not choose to follow it.

5. They commit a great and fatal error in making the mind perceive only the relations of Resemblance and Difference, whereas it has the capacity, as Locke and Hume and Brown maintain, of discovering a variety of other relations which penetrate deeply into the nature of things, such as those of Space and Time, of Quantity and Active Property, all of which the mind can perceive.

6. In particular, they do not take sufficiently deep views of such relations as those of Personal Identity and Causation. In not noticing the knowledge of self in the original perceptions of consciousness, they do not expose to view what is involved in the identity of self in its successive states, which as perceiving we are prepared to believe in its immortality. Again, they represent causation merely as invariable antecedence which may not hold in all times and in all space, whereas it consists in a power in the agents acting as the cause and producing the invariableness, and constraining us to rise from real effects to a real cause supreme in God.

7. Their grand error consists in overlooking what is involved in morality, in our Moral Perceptions, which discern the good as distinctly as extension is seen by the eye. In not noticing these facts they are missing the very highest qualities in our moral and spiritual nature.

8. Their account of the Feelings or Emotions is meagre. They are apt to identify them with mere sensations, which again they identify with nervous affections. Herbert Spencer does this. They do not fully apprehend that in all emotion there is an appetence or spring of action, say the love of pleasure, or the love of power, or the love of good, and an idea of the object which calls forth the emotion, as fitted to gratify or disappoint the appetence.

9. They deny that man has Free Will; they make him the mere evolution and creature of circumstances. The realistic philosophy will require carefully to unfold the nature of free choice as an inalienable prerogative of man.

In all these and in other ways the modern English School is degrading our nature, and with it all high philosophy—leaving us little but shallows in a waste of weary sand. We are obliged to them for showing wherein man agrees with the brutes, but we must have others to show us wherein man is above the brutes. It must be one of the highest offices of the realistic philosophy to expose the errors and supply the deficiencies of this school.

But it will be urged, that if philosophy is kept within such rigid fences it will lose much of its attractiveness, and metaphysical and dialectic youths will complain—as bitterly as the Indians do when they say they have no room for hunting in these enclosed fields where they must be contented to plough and sow. As the result, there will be no room for speculation such as was indulged in by Plato, by Leibnitz and the higher German philosophers.

To this I reply that there will still be a rich possession left to philosophy to cultivate, and one as much more fertile and profitable—above mere guesses—as agriculture instead of hunting will turn out to be to the Indian. By

imposing judicious restrictions we do not deny to philosophy any of its prerogatives; we merely prevent it from becoming an arena in which one system lives to fight against another. It will still be allowed to inquire into the opinions of the thinkers of all ages and countries, as Cudworth did in England and Hamilton did in Scotland, and as German scholars are still doing Not only so, these opinions may be analyzed and criticised, always on the condition that the ultimate test of truth be the facts in our nature. Historical criticism will have a boundless field in determining what were the precise opinions of the eminent thinkers of antiquity, and in settling what truth there is in Plato's ideal theory, in Aristotle's analytic of thought, and in the Stoic and Epicurean discussions as to the relative places of virtue and pleasure. The gold will have to be gathered from the sand in the desert of the Middle Ages. Coming down to modern times it will have to settle what are the limits to the method of induction as expounded by Bacon, and to what fields the combined dogmatic and deductive methods of Descartes and Spinoza are to be confined. It will have to weed out all the idealism and sensationalism in Locke's *Essay*, and so explain the great truths regarding experience which he has expounded so as to keep them from issuing logically in Humism. It will have to take special pains to keep thinking youth from embracing the errors along with the truths of Kant. While standing up resolutely for à priori truths such as causation, it will show that these are not forms in the mind imposed on things but realties in the nature of things. It will have to acknowledge that there is such a process as evolution, but it will also prove that this cannot account for the origin or beneficent order of things. I am inclined to go a step farther, and allow full freedom to guesses, queries, speculations, theories, care

being taken to represent them as mere hypotheses till they are established as facts by facts.

Is not the world open to our view as it was to that of our forefathers? I am sure that it is as full of wonders as it ever was. The physical investigator does not complain that those who lived in the past have drawn all its wealth from the universe. It is the very fact that so many real discoveries have been made that makes him expect more without limit and without end. The ground that has been so enriched with the deposited vegetation of the past will yield larger and richer vegetation and fruit in the future. I believe that there are as many unexplored regions in the mental as in the physical world. I am sure that all the laws and properties of mind have not yet been discovered. It has secrets alluring us to seek to discover them, and sure to reward us for the labor we devote to the search after them. If the modern cannot go so far and mount as high as the ancient it must be because his mental capacities are not so great, and this he will scarcely be prepared to admit. The world as we look upon it is as boundless as it ever was, and human nature is as full and fresh and inexhaustible as it was seen to be in ages past.

A new region has been opened to the modern. A keen interest within the last age has gathered round the relation of brain and nerves to the operations of the mind, or what is called Physiological Psychology. It is a difficult subject, but this only makes it more attractive to the adventurous explorer. It is full of the promise of discovery, and youth will rush into it as to a newly discovered mine. We know much now of the laws of the mind, we know something of the physiology of the brain—careful experiments are being performed by competent men in various countries. We seem to have come to a position at which we may

unite the two lines of inquiry, and they will be found to throw light on each other. The physiologist in his department will insist on proceeding only in the method of observation; let the psychologist do the same. Let each require of the other that he restrain premature hypotheses. As the result, we shall have an immense accumulation of empirical facts, rising, according to Bacon's recommendation, to "minor, middle, and major axioms," promising in the end to reach some grand laws which, while insisting that mind and matter are different substances, will realize the sublime conception of Leibnitz by uniting them in a pre-established harmony.

They who start this Realism are proclaiming a rebellion against all modern schools, à posteriori and à priori, and if they persevere and succeed are effecting a revolution. In doing so they are not overturning but settling fundamental truth on a surer foundation—as the Reformers in the sixteenth century did not destroy religion, but presented it in a purer form. Fertility will be produced by this new upturning of the soil.

This attempt, if it is noticed at all, will be assailed by the modern systems of Europe. The monarchies of the old world will look with doubt, perhaps with scorn, upon these republics of the new world which acknowledge no king. The Hegelians will not deign to look at us, because we do not proceed by dialectics and put the world into trinities. The materialists will represent us as following illusions, because we claim to be able by internal observation to discover high moral and spiritual truth. But in spite of all efforts to keep it down, realism, which is the obvious and the naturalistic philosophy, will ever, will again and again, come up and assert its claims. Meanwhile we keep our place; we mean to carry on and consolidate our work, and we may in the end secure attention and recognition. Act-

ing on the Monroe principle, permitting no foreign interference, and allowing the old systems to fight their battles with each other, we hold our position and may come to command respect, as the United States have done, after being long contemned by European countries; and they may be induced to seek our established truths—as they do the corn and cattle reared in our virgin territory.

I

CRITERIA OF DIVERS KINDS OF TRUTH

INTRODUCTION.

The age may be characterized as one of *unsettled* opinion. Our ambitious youth are not satisfied with the past, its opinions and practices. Authority is not worshipped by them; they have no partiality for creeds and confessions. They do not accept, without first doubting, the truths supposed to be long established. In searching into the foundation of the old temples, they have raised a cloud of dust and left lying a heap of rubbish. It is an age out of which good and evil, either or both, may come according as it is guided. We may entertain fears, for it is dancing on the edge of a precipice down which it may fall. We may cherish hope, for it is an inquiring age.

Every form and phase of opinion seeks to have a philosophy, in which it may embody and express itself and by which it may be defended. Agnostics is the shape or figure which the doubting and hesitating spirit takes. It is not a new heresy. It has been held by a few in every age; it is now espoused by many, provisionally, till something more solid or showy is propounded. It used to be called Nescience, which maintains that nothing can be known, and Nihilism, which holds that there is nothing to be known. It is of little use trying to argue with it, for it allows us no premises as a ground on which to start, and has no body or substance that we can attack. It is easy to show that it is suicidal. It is an evident contradiction to affirm that we can know that we know nothing.

But when we have demonstrated this we have not destroyed it any more than we have killed a spectre by thrusting a spear into it; for its defence is, that all truth is contradictory. The best way of dealing with it is to allow it to dance as it may, like the shadows of the clouds, and, meanwhile, to found and build up truth and set it up before the mind, that it may be seen in its own light. It is well known that when we see a solid object through and beyond a spectre, the spectre melts away and disappears. So it will be with agnosticism—it will vanish when we fix our eyes upon the truth. This is what is attempted in No. I. of the treatise.

The work is expository, and, for the reasons just hinted at, is not controversial. It is meant for those who wish, for their own satisfaction, to know the foundations on which the truth which they are required to believe rests. It is also hoped that, it being a treatise on what Kant calls Applied Logic—which may be made quite as useful as Primary or Formal Logic—it may be used as a text-book.

We have truth when our ideas are conformed to things. The aim of this work is to show that there is truth, that truth can be found, and that there are tests by which we may determine when we have found it. We do not propose to guide inquirers in any particular department of investigation; this can best be done in introductions to the books and lectures treating of the several branches of knowledge.

Kant and the German metaphysicians have shown again and again that there is no one absolute criterion to settle all truth for us; that will determine, for example, at one and the same time, whether there is a fourth dimension of space; whether the planet Jupiter is inhabited; where the soul goes at death, and what kind of crops we are to

have next year. But it can be shown that there are truths which may be ascertained, and that there are criteria which prove when they are so, and these clear, sure, and capable of being definitely expressed. But the test which settles one truth for us does not necessarily settle all others, or any others. It is necessary to distinguish between different sorts of truth, and we should be satisfied when we find a test of each kind. The aim of the criteria, it should be noticed, is not so much to help us to discover truth, as to determine when we have found it.

The work is divided into two Parts: one in which we seek to find the Criteria of First Principles, and in the other the Criteria of Individual Facts and their Laws.

PART FIRST.

CRITERIA OF TRUTHS TO BE ASSUMED.

SECTION I.

FIRST AND FUNDAMENTAL TRUTHS.

The mind must start with something. There are things which it knows at once. I know pleasure and pain. I do more: I know myself as feeling pleasure and pain. I know that I am surrounded with material objects extended and exercising properties. I know by barely contemplating them that these two straight lines cannot contain a space. These are called first truths. There must be first truths before there can be secondary ones; original before there can be derivative ones. Can we discover and enunciate these? I believe we can.

We are not at liberty, indeed, to appeal to a first principle when we please, or because it suits our purpose. When we are left without evidence, we are not therefore allowed to allege that we need no evidence. When we are defeated in argument, we are not to be permitted to escape by falling back on what is unproved and unprovable. It is true that we cannot prove everything, for this would imply an infinite chain of proofs every link of which would hang on another, while the whole would hang on nothing—that is, be incapable of proof. We cannot prove everything by mediate evidence, but we can show that

we are justified in assuming certain things. We cannot prove that two straight lines cannot enclose a space, but we can show that we are justified in saying so. We can do so by the application of certain tests.

Self-Evidence is the primary test of that kind of truth which we are entitled to assume without mediate proof. We perceive the object to exist by simply looking at it. The truth shines in its own light, and in order to see we do not require light to shine upon it from any other quarter. We are conscious directly of self as understanding, as thinking, or as feeling, and we need no indirect evidence. Thus, too, we perceive by the eye a colored surface, and by the muscular touch a resisting object, and by the moral sense the evil of hypocrisy. The proof is seen by the contemplative mind in the things themselves. We are convinced that we need no other proof. A proffered probation from any other quarter would not add to the strength of our conviction. We do not seek any external proof, and if any were pressed upon us we would feel it to be unnecessary—nay, to be an encumbrance, and almost an insult to our understanding.

But let us properly understand the nature of this self-evidence. It has constantly been misunderstood and misrepresented. It is not a mere feeling or an emotion belonging to the sensitive part of our nature. It is not a blind instinct or a belief in what we cannot see. It is not above reason or below reason; it is an exercise of primary reason prior, in the nature of things, to any derivative exercises. It is not, as Kant represents it, of the nature of a form in the mind imposed on objects contemplated and giving them a shape and color. It is a perception, it is an intuition of the object. We inspect these two straight lines, and perceive them to be such in their nature that they cannot enclose a space. If two straight

lines go on for an inch without coming nearer each other, we are sure they will be no nearer if lengthened millions of miles as straight lines. On contemplating deceit we perceive the act to be wrong in its very nature. It is not a mere sentiment, such as we feel on the contemplation of pleasure and pain; it is a knowledge of an object. It is not the mind imposing or superinducing on the thing what is not in the thing; it is simply the mind perceiving what is in the thing. It is not merely subjective, it is also objective—to use phrases very liable to be misunderstood; or, to speak clearly, the perceiving mind (subject) perceives the thing (object). This is the most satisfactory of all evidence; and this because in it we are immediately cognizant of the thing. There is no evidence so ready to carry conviction. We cannot so much as conceive or imagine any evidence stronger.

Necessity is a secondary criterion. It has been represented by Leibnitz and many metaphysicians as the first and the essential test. This I regard as a mistake. Self-evidence comes first, and the other follows and is derived from it. We perceive an object before us and we know so much of its nature; and we cannot be made to believe that there is no such object, or that it is not what we know it to be. I demur to the idea so often pressed upon us that we are to believe a certain proposition because we are necessitated to believe in it. This sounds too much like fatality to be agreeable to the free spirit of man. It is because we are conscious of self that we cannot be made to believe that we do not exist. The account given of the principle by Herbert Spencer is a perverted and a vague one: all propositions are to be accepted as unquestionable whose negative is inconceivable. This does not give us a direct criterion, as self-evidence does, and the word inconceivable is very ambiguous. But necessity, while it is not

the primary, is a potent secondary test. The self-evidence convinces us; the necessity prevents us from holding any different conviction.

Universality is the tertiary test. By this is meant that it is believed by all men. It is the argument from catholicity, or common consent—the *sensus communis*. All men are found to assent to the particular truth when it is fairly laid before them, as, for instance, that the shortest distance between two points is a straight line. It would not be wise nor safe to make this the primary test, as some of the ancients did. For, in the complexity of thought, in the constant actual mixing up of experiential with immediate evidence, it is difficult to determine what all men believe. It is even conceivable that all men might be deceived by reason of the deceitfulness of the faculties and the illusive nature of things. But this tertiary comes in to corroborate the primary test, or rather to show that the proposition can stand the primary test which proceeds on the observation of the very thing, in which it is satisfactory to find that all men are agreed.

Combine these and we have a perfect means of determining what are first truths. The first gives us a personal assurance of which we can never be deprived; the second secures that we cannot conquer it; the third that we can appeal to all men as having the same conviction. The first makes known realities; the second restrains us from breaking off from them; the third shows that we are surrounded with a community of beings to whom we can address ourselves in the assurance of meeting with a response.

But in order to be able to apply these criteria properly we must carry along with us certain explanations and limitations.

1. It should be noticed of intuitive truths that they are,

in the first instance, *individual* or *singular*, and that we need to generalize the single perceptions in order to reach general maxims. In them we begin with contemplating a single object, say an external object, and know it to be extended and solid, or an act of benevolence and know it to be good, or an act of cruelty and proclaim it to be evil. But we can generalize the individual perceptions, and then we have general maxims or axioms, which we can apply to an infinite number of cases. We perceive that these two parallel lines will never meet; and we are sure that we should affirm the same of every other set of parallel lines, and hence we reach the general maxim that parallel lines will never meet. We perceive, on the bare contemplation of this deed of deceit, that it is base, but we would feel the same of every other deed of deceit, and hence the maxim deceit is evil. But it should be observed that in the formation of these general principles there is a discursive act, in the shape of a generalizing process, involved. It is here that there may creep in error, which is not in the intuitive but in the discursive process; for we may form a partial, a one-sided, or exaggerated generalization. Thus, on discovering a particular effect we at once judge or decide that it has a cause. But when we would make the principle universal we may fall into a mistake, and declare that "everything has a cause," which would require an infinite series of causes and make it necessary to hold that God himself has a cause. In such a case our generalization is wrong. But let the maxim take the form that "everything which begins to be has a cause," and we perceive that on a thing presenting itself to us as beginning we should proclaim it to have had a producing power. We thus see that there may be both truth and error in our metaphysical or moral maxims: truth in the primitive perception at the basis of the whole, while there may be hastiness leading to mutilation in the ex-

pression. Hence the wrangling in metaphysics. Thus, everybody acknowledges that two parallel lines can never meet, but there may be disputes as to the fit form in which to put the axiom. So, in regard to the generalized principles that every effect has a cause, that every quality implies a substance, that virtue is commendable, there may be a difficulty in expressing exactly what is meant by cause and effect, what by substance and quality, and what by virtue and moral good; and we may find that when we would make the expressions definite we fall into grievous mistakes, and this while we are certain that there is a self-evident, necessary, and universal truth if only we can seize it.

2. First truths are of various kinds, which we shall endeavor to classify. Some of them are

Primitive Cognitions. In these the object is now before us, and is perceived by us. We perceive that this body has three dimensions in space, and cannot be made to believe otherwise. We decide that this thing, material or mental, cannot be and not be at the same time; that these two things, being each equal to the same thing, are equal to one another. In these cases the object is perceived at once and immediately. But there are others in which the object is not present, and the convictions may be regarded as

Primitive Beliefs. Here there is still an object. It is not present, but still it is contemplated. We have known the object somehow, and on conceiving it beliefs become attached to it. Thus, we know time in the concrete, and in regarding it we believe that time is continuous, that time past has run into time present, and that time present will run into time to come. A number of such faiths gather round our primitive cognitions and widen them indefinitely. We see two points in space; we are sure that there is

space between, and that the shortest line between the two is a straight line. We can rise to still higher faiths. We believe of certain objects, say space and time, and God—when we come to know him—that they are infinite, that is, that they are always beyond our widest image or concept and such that nothing can be added to or taken from them. The senses cannot give us these beliefs, nor can the understanding construct them out of the materials supplied by the senses. Some of them, such as the idea of the infinite, the perfect, lift us above our immediate experience into a higher sphere. We begin in all such cases with realities perceived or apprehended; and we are sure, if we proceed ligitimately, that we end with realities. It should be remarked that in order to our having these cognitions and beliefs it is not necessary to express them or even put them in the shape of propositions. It is necessary first to have cognitions or beliefs regarding them before we form comparisons of them or affirm that they exist or possess certain properties. But out of these we can form

Primitive Judgments, in which we predicate—that is, make affirmations or denials—or discover certain properties or relations, as when we say space and time are without bounds and exist independent of the contemplative mind. In order that these judgments may be primitive they must be pronounced as to objects which have been perceived by intuition.

I ought here to add that the mind is capable of perceiving at once certain moral qualities, and we have

Moral Cognitions, Beliefs, and Judgments. On contemplating an act of self-sacrifice done for a friend or a good cause we know it at once to be good, or an act of selfishness we perceive it to be evil. When these acts are done by our neighbors we cannot notice them directly, but we are sure that they are good or evil; and these may be

regarded as beliefs. When we put them in propositions we exercise judgment, as when we declare that sin deserves punishment.

But it will be asked, do we perceive the good and evil to be a reality, to be in the very thing. It might be allowed, it is urged, that intuitively we perceive matter to be extended and that two straight lines cannot enclose a space; for the matter, and the straight lines are before us. But moral excellence and depravity have no such reality, they exist only in our conceptions. To all this I reply that we have the acts before us in the one case as in the other; we have before us every day a deed and an implied affection of benevolence or of cruelty, and in it we perceive the morally good or the morally evil. The benevolence in this act of charity has a reality quite as much as the hand that bestows the alms or the alms bestowed. The malevolence in this calumny is a reality, quite as much as the tongue that uttered it or the newspaper that published it. The reality is of a different kind, no doubt, but it is of a kind which all acknowledge when they approve of the charity and disapprove of the scandal, and perhaps impose a penalty upon the person who has been guilty of it.

It is of vast moment, to ourselves and to the community, that we and all others should acknowledge, theoretically and practically, that there are other realities besides those of sense, and these higher and more enduring. It is the worst influence of the prevailing agnosticism that while it can have little power to keep us from believing in the things that are seen, it may have a mighty influence in keeping us from believing in and realizing the things that are spiritual, and therefore unseen, but eternal. The idealist errs when he denies the reality of a material world which, though temporal, is real. But the sensualist errs far more egregiously when he denies the existence of a spiritual

world, which is real and eternal. It should be the aim of the highest philosophy to carry us up, as Plato endeavored to do, to this high and pure region which has as high an existence as the heavens, which are its special dwelling-place. We should train ourselves, and especially train the young, to retreat from time to time into the higher world, that they may there hold communion with all that is great and good and elevating.

3. The complexity of our mental states places difficulties in the way of our applying the criteria. There are opinions which have been acquired by a lengthened and constant observation, which association has wrought into our very nature, so that we feel as if they are native and necessary; and yet some of them may be mere hereditary or popular prejudices which have no warrant in reason. In particular, experiential truths or even fancies and prejudices may so mingle with our intuitions that it seems impossible to separate them and determine which is the self evident principle in the complex notion. These circumstances, it should be admitted, do throw difficulties in the way of the application of our criteria. But these are not greater, after all, than the application of tests in any other department of knowledge, as, for example, chemical tests to determine the existence of poisons in very complex mixtures, and generally the verification of scientific discoveries of every description. But, in spite of these difficulties, the tests can be applied if only pains be taken to distinguish the things that differ and to lay aside the things that are irrelevant. It is possible, by a careful discrimination, to separate the associated from the primitive judgment, and thus seize the conviction that is native and necessary and apply the tests to it.

4. In many instances it is essential to apply the tests to alleged intuitive truths before we put trust in them. In

some cases, indeed, the spontaneous belief is so clear and assured that we may follow it without instituting any reflex examination. But in other cases the supposed necessary truth may be mixed with extraneous matter which adulterates it. Every one acknowledges that for the purposes of accurate science it is of importance to have the axioms of mathematics and mechanics so enunciated that no empirical element has entered. In morals and jurisprudence evil consequences might arise from mixing up doubtful principles with true ones, from assuming, for instance, that the promotion of happiness is the sole and essential quality of virtue. Without a sifting we might often be tempted by indolence or prejudice to assume as true what ought to be proven, or what, in fact, cannot be proven. It is of special importance to apply these tests to all those higher faiths which perform so important a part in mystic philosophy and theology. In these there is commonly a real intuition, and this, possibly, of an elevating, inspiring order as a nucleus; but around this there may gather a halo consisting merely of mist irradiated by the light in the centre. All high minds have felt the influence of these faiths, and some have been transported by them. But earthly ingredients are apt to mingle with the ethereal and heavenward aspirations, and claim all the authority which these have. The gilding gold is made to give currency to the coin. Truth and error thus come to be hopelessly intermixed, and visions of fancy come to be regarded as revelations of heaven. The sceptic detects this, and in pulling up the tares he uproots the wheat; to vary our illustration, in tearing down the creepers he pulls asunder the wall on which they grow. These results are to be avoided by a reflex examination of the whole mental exercise. The idea of Plato, the ecstacy of the Alexandrians, the perfect of Descartes,

Malebranche's vision of all things in God, the absolute of Kant, Schelling, and Hegel, the supposed inspirations of poets and the revelations to prophets who utter grand truths—all these point to and imply high realities; but they are liable to run into fancies and extravagances, into follies and deceptions, which mislead and delude those who believe in them, pervert their judgments, and render them ridiculous in the view of the world. There is gold in the mine, and all we have to do is, by crucial tests, to separate it from the dross that we may have the true metal.

SECTION II.

REASONED TRUTHS.

When we have got truth by self-evidence or by observation, we may add indefinitely to it by inference, in which we proceed from something given or allowed to something else derived from it by the mind contemplating it. If we have truth and reality in what we start with, and if we reason properly, we have also truth and reality in what we reach. Of course if what we assume be fictitious, what we arrive at may be the same. These inferences may be of three kinds, each of which has its tests.

Immediate Inferences, or what I am disposed to call *implied judgments*. Here we have a judgment given, and we derive other judgments merely from contemplating the two notions compared. All general concepts, as logicians know, have both extension and comprehension. The extension has reference to the objects in the class; the comprehension to the qualities which combine them. Now, on the bare contemplation of the extension of the concepts we can draw certain inferences, as when it is granted that

"all men have a conscience" we infer that "this man has a conscience," even though he be a liar. From the same proposition we can draw the inference in comprehension that the possession of a conscience is an attribute of man. The canon is that whatever is involved in the extension and comprehension of a notion may be legitimately inferred.[1]

Mediate Reasoning.—Here we do not discover the relation of two notions, or, as we call them when expressed in language, terms, by directly comparing them, but we can do so by means of a third term which has a connection with both. Reasoning thus consists in comparing two notions by means of a third. The canon of reasoning in its most general form is, "Notions which agree with one and the same notion agree with one another," with a

[1] From the proposition "men are responsible" the following may be drawn:

In Extension.

Every man is in the Class Responsible;
This man is responsible;
Some men are responsible;
Every tribe of mankind is responsible;
It is not true that some men are not responsible, etc., etc.

In Comprehension.

Man exists;
Responsibility is a real attribute;
Responsibility is an attribute of every man;
Responsibility is an attribute of this man;
Responsibility is an attribute of every tribe of men;
Responsibility is an attribute of some men;
Irresponsibility may be denied of all men;
No man is irresponsible;
Irresponsible beings are not men;
Men of wealth are responsible with their wealth;
To punish men is to punish responsible men.

See "The Laws of Discursive Thought: being a Text-book of Formal Logic," by James McCosh, LL.D.

corresponding dictum for negative reasoning. But the word "agree" is vague, and it is necessary to state the nature of the agreement. This is done by two formulæ, which act as the criteria of reasoning.

The Dictum of Aristotle.—We have before us a crocodile, and wish to know how it brings forth its young. Our two terms are "crocodiles" and "bringing forth their young." We find that it has been ascertained by science that the crocodile is a reptile, and that reptiles bring forth their young by eggs. We are now prepared to reason: "The crocodile, being a reptile, must bring forth its young by eggs." Here we have three terms: two called the extremes, the original ones which we wish to compare, "crocodiles" and "bringing forth their young by eggs," and a middle "reptile," by which we compare them. The process when expanded takes the form of two propositions, called the premises, and the conclusion drawn from them.

All reptiles bring forth their young by eggs;
The crocodile is a reptile;
Therefore it brings forth its young by eggs.

The conclusion is reached by the bare contemplation of the premises. The premises being true, the conclusion is true.

But this reasoning proceeds on a principle which it is desirable to have expressed and announced when it becomes the test of this kind of reasoning. It is, "Whatever is true of a class is true of all the members of the class." What is true of reptiles generally is true of the reptiles called crocodiles, and of every individual crocodile. If we have not something that can be predicated—that is, affirmed or denied—of a class to constitute a premise, no conclusion can be drawn. Thus, if only some reptiles are oviparous, if only the greater number are so, we are not entitled to conclude that the crocodiles must be so. We have thus a very decisive and easily applicable test of reasoning.

In formal logic this governing principle is spread out in various forms, so as to enable us to apply the test to every case of ratiocination. First, the syllogism is found to be the universal form of mediate reasoning. Then logicians divide reasoning according to the position of the middle term, which is the nexus of the argument, and this gives four figures. I do not mean to unfold these; they are to be found in every treatise on elementary logic. All that I have to do is to show that thereby we have a criterion of ratiocination.

All this was established by Aristotle in his "Prior Analytics." A number of attempts have been made since his day to set aside his analysis or to improve upon it. None of these have met with anything more than a temporary success. But I am not convinced that the dictum of Aristotle is the regulating principle of all reasoning; it regulates only that reasoning which involves a general notion—that is, a class notion. It can be shown, I think, that there is a ratiocination which does not proceed on the principle of classes, but of identity or equivalence. Thus, we find that the stick A is equal to the stick B, and the stick B is equal to the stick C, and we conclude that the stick A is equal to the stick C. Here we have no classes or members of a class. The canon is, "Notions which are equivalent to one and the same third notion are equivalent to one another." In ratiocination of this description the subject of the propositions may be made the predicate, and the predicate the subject:

> Shakespeare wrote "Hamlet;"
> The writer of "Hamlet" is the greatest English poet;
> Shakespeare was the greatest English poet.

All reasoning, in order to be valid, must fall under one or other of these rules, which are therefore the criteria of legitimate inference. When a professed argument cannot

be brought under either of them, it is a proof that it is not reasoning. When, on endeavoring to bring it under them, we find that it is not in accordance with them, we may conclude that the inference is not valid.

Reasoning may take several forms, which are legitimate provided they are in conformity with the dictum of Aristotle or the principle of equivalents. The natural form in ordinary circumstances is the categorical, in which we lay down a general principle and bring a particular under it; as when we say, "Consumption is a fatal disease, and as this man has consumption he has a fatal disease;" or, not being sure of the fact, we say, "If this man has consumption he has a fatal disease." This reasoning is hypothetical, and is quite as valid as the categorical. Or the reasoning may take the disjunctive form: "This disease is either a severe cold or consumption. It is not a severe cold; therefore it is consumption."

The greater portion of the reasoning in mathematics is regulated not by the dictum of Aristotle relating to classes, but the dictum of equivalence or equipollence.

SECTION III.

THE JOINT DOGMATIC AND DEDUCTIVE METHOD.

Here we begin with assuming something because it is self-evident, needing no farther proof; and then proceed to infer other truths involved. The best example is found in geometry, where there are laid down at the opening definitions of such things as triangles, circles, squares, and also axioms, or self-evident truths; and from these, and as involved in them, we get farther truths by deductive reasoning. We have also examples in Formal Logic, as

when the dictum of Aristotle is assumed, that whatever is true of a class is true of the members of the class, and from this get the modes and figures of reasoning, and innumerable inferences. The truths thus drawn are called apodictic by Aristotle and demonstrative by the moderns. In all such cases we have the tests of the assumed truths in self-evidence, necessity, and universality, and of the reasoned truth in the syllogism.

This method is powerful when we have the means of using it—that is, self-evident truths. But the field in which we have these is a very contracted one. In all investigations which deal with scattered facts the method is not available. "A clever man," says Sir John Herschel ("Nat. Phil.," § 67), "shut up alone and allowed unlimited time, might reason out for himself all the truths of mathematics by proceeding from those simple notions of space and number of which he cannot divest himself without ceasing to think. But he could never tell, by any effort of reasoning, what would become of a lump of sugar if immersed in water, or what impression would be left on his eye by mixing the colors of yellow and blue."

The method has often been applied illegitimately—that is, to departments which have to deal with scattered facts. In the sixteenth century, when mathematics were making such progress, there were attempts to carry the geometrical method into all branches of science. It was used by Descartes and his extensively ramified school in philosophy and also theology. Assuming the existence of thought, of *cogito*, as a truth which cannot be doubted, he thence proves his own existence, which it would have been wiser in him to assume, and then from the idea of the infinite and the perfect in himself, he argued there must be a perfect being existing whose veracity guarantees our idea of matter. Spinoza, in his Ethics, begins with a formidable

array of definitions, axioms, and postulates, whence he draws out a system in which God is at once extension and thought, and being the All is the morally evil in the world as well as the good. Samuel Clarke, finding that man could not get rid of the idea of space and time, argued that since all things must either be substances or modes, and as space and time are not substances, they must be modes of a substance, which is God, which by other considerations he clothed with benevolence. In these connected systems doubtful definitions were carried out, often by right reasoning, to very doubtful results. In all cases in which we have to use facts, and in which we seek to rise to facts, such as the existence and character of God, there is another method, that of induction, with it, it may be, deduction, which we may and ought to employ.

PART SECOND.

CRITERIA OF INDIVIDUAL FACTS AND THEIR LAWS.

SECTION IV.

INDIVIDUAL FACTS.

An eminent man is reported as saying that there are more false facts than false theories. There is truth in this. Facts are apt to have adjuncts to them in the reports given by others, and even in our own apprehensions of them, or they are so mutilated that they take an entirely distorted form. We all know how in story-telling additions and subtractions are apt to be made even by honest narrators, so as to make it more attractive and picturesque.

The individual facts are primarily made known by the senses, external and internal. In these there may be very numerous and complicated details, and any of these if left out may so far distort our apprehensions and the account we give of them. Besides, sensations, feelings, fancies, inferences, attachments, and repugnances may mingle with our pure perception of sense and cast a glow or a gloom around them. In these sections I am showing that we have to guard against these temptations, and that when we do so we can arrive at positive truth.

Observation Proper and Experiment.—These are the two ways in which we obtain facts. In the former we

view objects simply as they present themselves; in the latter we put them in new positions. The advantage of Experiment over Observation Proper (which may be so designated as Experiment, is, after all, a kind of Observation) is that it enables us to perceive the proper action of the several agencies joined in nature. We wish to know whether bodies, whatever be their weight, fall to the ground in equal times. Common observation seems to show that they do not, as we see the gold nugget and the leaf falling at very different times. But we put the gold and the leaf into the exhausted receiver of an air-pump, and find them fall the same instant. What we should do in all observation is to note precisely what has occurred, and to report it accurately without any additions, subtractions, or coloring; we must be especially on our guard against torturing the facts in order to make them give a certain kind of testimony.

The Senses.—The older Greek philosophers adopted the common opinion that the senses deceive. The sceptics took advantage of the doctrine and argued that if the senses deceive there is nothing we can trust in. The sounder philosophers met them by calling in reason, which corrected the illusions of the senses and conducted to truth. Aristotle corrected both these forms of error, and showed that the supposed deception arises not from the senses themselves, but from the use that is made of their intimations.

To save the senses it is necessary to draw certain distinctions. In particular, we should distinguish between our original and derived perceptions. The former are intuitive, without any process of inference, having the sanction of the author of our constitution, and never deceiving us. The latter imply inferences from the revelations of sense perception, and there may be errors in them.

I believe we can approximately determine what are the

original perceptions of the various senses. By several of the senses we seem to perceive merely the bodily organs as affected. This is the case with taste and with smell, in which we discern simply the palate and the nostrils with a certain sensitive expression of the palate and the nostrils. It is the same also, I believe, with hearing and with touch proper or feeling, in which we know simply an affection of the ear and the periphery of the body. I rather think that by the muscular senses and the eye we discern more; a body resisting our organism and a colored surface affecting us. In all these intuitive perceptions there is no ratiocination, and there are and can be no mistakes. But in all beyond there are inferences, and in these there may be less or more of error. A person tells us that he had mutton to dinner, whereas all he knew was that there was a certain taste in his mouth which he argued was that of mutton. He further lets us know that he felt the smell of roses in a certain garden, where he also heard a flute playing, whereas immediately he felt only an odor in his nostrils and a sound in his ear. He is sure that he was struck in the dark with a man's hand, whereas the blow was from a stick. He depones that he saw a man strike his wife, while all he saw was an action of one figure upon another, and it turns out that the woman was not the man's wife. Hence arise some of the mistakes in witness-bearing; they are not lies of the senses, but errors in the inferences we draw from them.

In all such cases we form a general rule out of certain experiences, and in hasty thinking we illegitimately apply it. We regard sound as coming to our ear in a straight line from the sounding body, but the undulations have been reflected from a wall, and we place the bell from which they have come in that wall, whereas the belfry is actually in a different direction. It is on this principle

that the ventriloquist proceeds when he makes a human voice come from a post or an animal. Having laid down the rule that when there are few observable things between us and an object, it must be near, we look on that island seen across the sea as much closer to us than it is.

Some other distinctions must be attended to. Sensations and feelings, of pleasure and pain, of beauty and ugliness, associate themselves with all our perceptions, and are apt to give a color and even a shape to the actual things. We remember more particulars about the objects that excite us, whether joyously or grievously, than those that are dull and commonplace, and we give these a large, often an undue place in our narrative, and thus distort them and give them a different meaning.

The rapid inferences from the intimations of the senses may at times serve a good purpose. They may prepare us to meet and avoid danger when cool and correct argument would not be quick enough. A fire-bell, the jolt of a carriage in which we are riding, a stumble in walking, the fog-whistle at sea, may at times raise up an unnecessary alarm, but the calm reflection which succeeds will soon dissipate this, and at other times they save us from danger.

We have abundant means of correcting the hasty judgments. We have other senses at hand to correct the apparent deceptions of one sense. We imagine the figures raised optically by magicians to be real, but we can dissipate the illusion by thrusting our hand into the spectre. We may mistake beef for mutton as we eat it, but it is easy to apply to the person who prepared the food to set us right. A diseased eye may present objects double, but the touch will correct the mistake. In all cases we can secure that what is told us by the senses is true by judiciously using the means of correction at our disposal.

Self-Consciousness.—Metaphysicians commonly main-

tain that the revelations of consciousness are always to be trusted; that they settle everything in the last resort, and are, in fact, ultimate and infallible. But there are physiologists, and of a late date even metaphysicians, who assert that the acts of consciousness are variable and often deceitful. They show us that people often misapprehend what their real feelings are, and give a wrong account of them. It is alleged that there are persons who say that they believe certain tenets while they do not, only imagining that they do. There are cases of persons with a "double consciousness," as it is called, remembering, in the one state, their experience of that state, but without any remembrance of it in the other.

But in all such cases we attribute to consciousness what it is not responsible for. In regard to the inner, as in regard to external sense, we have to draw distinctions if we would determine its precise testimony. It is acknowledged by all psychologists that, properly speaking, we are conscious of self only in its present state. In that state there are various affections: there are sensations and feelings and inferences along with the pure consciousness, and we are apt to mix them up with each other, and thereby breed confusion in our apprehensions and in the account we give of what is in our mind. When we review our consciousness we are dependent on our memory, and we may omit some aspects of our experience and add associated affections. Here, as in regard to the bodily senses, distance is apt to lend enchantment to the view. The hypochondriac magnifies his sorrows, and the gay youth his pleasures in the past. People are apt to think their youth was happier than it really was; they remember their joys and forget the little disappointments which were then felt to be so great and now appear so little.

What is so called is not really "double consciousness."

It arises from a diseased state of the brain hindering psychical action. The person is unable to recall what has been laid up in the past, and he lives in the present and lays up a new experience, which he uses in his new state, but which he may lose in a later condition of his brain. The man is not under a double consciousness, but in two states, in each of which the consciousness may be correct.

It thus appears that man may trust in what his consciousness really reveals. It makes known to us self in its present state. It should be noticed that it does not know merely a quality of self, such as thinking or feeling; it knows self as thinking or feeling. This is of the nature of a first truth or an intuition; we perceive the very thing. This self constitutes what we call personality—that is, we know ourselves as persons. On comparing the self as presently known with the past self as then known, we declare ourselves to be the same. This is personal identity, which is a self-evident, necessary, and universal truth.

Memory.—The vulgar opinion is that the memory may deceive. But it does so only as the senses deceive. The mistakes are not in the memory proper, but in the associated affections and the inferences drawn from them. We ask a man how long it is since he visited us. His recollection is dim, and he makes the time longer than it is, six years instead of five. It is not possible for him to remember his continued existence during these years, any more than it is possible for the eye to see every point in space between us and objects five or six miles off. In both cases he has to avail himself of intervening objects. The event, he remembers, took place after his marriage, seven years ago, for his wife was with him; and before his mother's death, four years ago, for he remembers we made inquiries about her health. But he does not recollect at what precise date between these two occurrences the visit

was paid. The reminiscence is dim and he concludes that the event is more distant than it really is. Our memories in regard to time all need such mile-stones, or rather time-marks, to enable us to measure the distances. Now, in all these processes there may be mistakes. It is much the same with our recollections of the other circumstances connected with events, such as the shape and color of objects, their position in relation to other things, their surroundings, their antecedents and consequents. The vision is obscure and we have to fill it up, and we do so by fancies of our own, which so far modify the scene, perhaps pervert it. We are apt to join causes and consequences with the bare occurrences. This is especially apt to be the case with conversations, with the sentences uttered by ourselves or by others. We recollect how we felt, what we meant to say, what effect was produced on us by what others said, and we confound these with what was actually uttered. Hence the misunderstandings, the perversions which are so apt to appear in the reports of conversations. In the complicated scenes through which we have to pass we remember those parts that have been most vivid—these, I suppose, have impressed themselves most deeply on our organism, and the others are feebler. The consequence is that the record has faded in some places, and we make additions in order to complete it. In this way we clothe our bare memories with dresses, which may make them look sadder or more joyful than the events really were at the time.

But it is always possible to distinguish between our original and proper recollection and our superadded and fictitious ones. Those who are conscientious will be careful not to add out of their own stores to their memories. When the reminiscence is dim they will at once confess it, especially in witness-bearing, and when the character of a fellow-man may be affected. In all scenes which we wish

to remember accurately, we will take pains to note the exact incidents at the time they occurred. There are events of which we may be, and are certain, that they have happened.

Testimony.—It is not necessary to suppose, with some of the Scottish metaphysicians, in their answers to Hume's argument against miracles, that there is an original instinct or principle of common sense leading us to trust in testimony. I believe, indeed, that there is a social affection in all of us inclining us to have an affection for, and trust in, those we meet with, especially in father and mother, brothers and sisters, and leading us to believe in what they say. But the belief in testimony is the result of experience, and is modified by experience; we trust in certain testimonies, but not in others. There is a conscience in every man which disposes him, if he does not resist it, to speak truly; even selfishness prompts him not to lose the confidence of his fellow-men by deceiving them. Hence, the great body of mankind speak the truth when they are not led to act otherwise by a desire to excuse themselves, or by malignity toward their neighbor, or some other like motive. We can reach truth by means of testimony. It was in his haste that David said "All men are liars."

The testimony of one man is often sufficient, because of his character known otherwise; and because he has no motive to deceive. We lay down rules for our guidance in judging of testimony, as that it is a good sign if the statements are direct and unartificial. In most cases we seek to have the testimony of one man confirmed by another, that in the mouth of two or three witnesses every word may be established, it being shown that there has been no collusion or conspiracy. There are commonly circumstances which corroborate or detract from the testi-

mony. Circumstantial evidence is at times sufficient to prove that a prisoner has been guilty, when there is no direct evidence of the act. In witness-bearing, books of law and judges on the bench lay down rules which may guide the jury in the verdict which they bring in.

History.—Here the evidence is mainly that of written testimony, which, however, may be confirmed by original historical documents, such as monuments, inscriptions, coins, and ancient charters. Laplace, misled by a false analogy derived from the diminution of light when reflected successively from a number of surfaces, declares that the value of testimony may be weakened by transmission, and at length altogether lost (*Essay on Prob.*). This is true of tradition, that is, of oral testimony transmitted from mouth to mouth, or from age to age; but Sir G. C. Lewis (*Meth. Obs. and Reas.*) has shown that, "when the testimony of the original witness has once been obtained and recorded, either by himself or others, in an authentic form, it is perpetuated so long as the written memorial of it is preserved in the original, or in a faithful transcript, and may at any time be used for historical purposes."

SECTION V.

INDUCTION.

This consists essentially in gathering facts in order to ascertain the order that they follow, which will be found to consist in laws which they obey. It was known to Aristotle that the mind starts with the singular (*τὸ ἑκάστον*) before it rises to the universal (*τὸ καθόλου*), which, as he expresses it, may be first in the order of nature, while the singulars are first in the order of time. He practised the method in his natural history, very specially by the collec-

tions which were supplied by his pupil, Alexander the Great. But he cannot be said to have systematically expounded induction as a method of discovering truth. This was reserved for Francis Bacon, who enjoined that in observational science, the mind should begin with particulars, which are to be collected and collated, and then rise to minor, middle, and major axioms, and thence finally to causes and forms. All this was to be done not *per saltum*, but by gradual steps. The method has since been made more definite by Sir John Herschel, in his "Natural Philosophy;" by Dr. Whewell, in his various works on "The Philosophy of the Inductive Sciences;" by John S. Mill, in his "Logic," and by others. The method will become more perfected as science advances with its observations and experiments, with its instruments and its critical examinations. That method has a Means and an End. The Means are observation with analysis. The End is the discovery of laws.

Analysis and Synthesis.—By the former we separate a concrete or complex object into its parts. In chemistry there is an actual separation of one element from another, say the oxygen from the hydrogen with which it is combined in water. But in most investigations, the separation is in thought. Thus in all bodies we find both extension and energy, which cannot be separated in fact. Thus logicians analyze discursive thought into simple apprehension, judgment, and reasoning, or in the expression of these into the term, the proposition and argument. The process is performed by abstraction, in which we contemplate in thought a part of a whole presenting itself, more particularly an attribute of an object, say gravitation. In analysis we separate the whole into its several parts. Abstraction can be performed on every object, as every object has more than one quality, and we can fix on any one of these. Analysis

can be performed only when we have such an acquaintance with an object as to know all its parts.

The exercise of abstraction, and when it is available of analysis, is required in every kind of investigation. Bacon speaks of induction, commencing with "the necessary rejections and exclusions," that is, the separating of the matter to be investigated from the extraneous objects with which it may be associated in nature. Whately says ("Logic") that in teaching a science, the analytical mode is the more interesting, easy, and natural kind of introduction, as being the form in which the first invention or discovery of any kind of system must originally have taken place. Whewell gives an apt name to the procedure, which he recommends as the "Decomposition of Facts." It serves not only to separate objects from others, but to break them down, so that we may obtain a better acquaintance with them, with their internal structure and their several qualities. It is a process to be employed throughout in all investigations of nature, which in every department is full of complexities.

Analysis can scarcely be described as discovering truth. It is rather a means or instrument toward this end. At the same time, it should be noticed that when we abstract a part, say a quality, from an object, the part, the quality, has a reality as well as the whole. If the concrete be real, the abstract is also real. The abstract may not have an independent reality; thus gravitation has no reality except in body, but it has a reality in body. The criterion here is that the part be really a part of the actual whole, that the quality be a real attribute of a real thing.

Analysis is a sharp and may become a dangerous instrument. It may be over subtle and dissect and kill what should be kept alive and entire. It is fulfilling its end only when, to use an illustration of Plato's, it is dividing the

carcass as the butcher does, according to the joints. Among the ancient Greek philosophers the analytic was the method commonly employed. Down to this last age the analytic and the synthetic were represented as methods of discovering truth, and had large fields allotted to them. Kant's great work, the "Critick of Pure Reason," is divided into the analytic and synthetic parts.

In synthesis the parts are put together to show that they make up the whole. Thus Whately decomposes discursive thought into the term proposition and argument, and then shows synthetically that these make up the whole process. Sir John Herschel, in his "Astronomy," begins with taking up the several departments of the heavens, and then expounds the whole science. The two, analysis and synthesis, must continue to be used as instruments, but they now do so in the methods of induction and deduction.

Criteria of Laws.—Hitherto we have had to do with individual facts, which tell us nothing beyond themselves. We have not as yet any means of anticipating the future from the past, or gathering wisdom from experience. In particular, we have no science, which consists, not of scattered and isolated facts, but of systematized knowledge. In the construction of science we must co-ordinate the facts. In doing so we discover the laws and find that all mundane affairs are regulated by laws.

But the question arises, How do we from individual facts reach a law? Or, more specifically for our present purpose, When are we entitled to conclude and be satisfied that we have found a law which may be regarded as general or universal? The answer of those who have not thought specially on the subject would be, When we have observed all the facts. But a moment's reflection shows that in most cases, I believe in all, we cannot find out all the facts. We assert that crows are black, but we cannot

go the round of the world and ascertain that it is so. We may have examined millions of cases and found all crows black, but how do we know that a traveller may not report that he has found a white crow in some distant island? In science we say that all mammals are warm-blooded, or that all matter attracts other matter inversely according to the square of the distance; but no one has searched the universe and noticed every mammal and every particle of matter so as to be able to say that no mammal is cold-blooded, and no particle of matter without the power of attraction. But from a limited number of observations we can rise to a law which seems to be universal. How is it so? Mr. Mill maintains that he who can answer this question is wiser than the ancients.

Bacon describes the method of observation by "perfect innumeration" of cases as puerile and incapable of yielding any fruitful results. In induction we have to rise from the unknown to the known. We argue from a limited number of cases in the past to a universal law which we hold to be true in the future, not only so, but in all unknown cases, past and present. The father of inductive philosophy was aware of the difficulty of the problem, and he sought to solve it by bringing in Prerogative Instances (*Prerogativæ Instantiarum*) which could determine what is true of all instances. To give only one example, that of *Instantia Crucis*, the metaphor being taken from the notice put up where two roads meet to tell which to take. It was disputed whether light consists of material particles or of vibrations in an ether. To settle this it was maintained by Fresnel that instances can be artificially produced which are inconsistent with the material, but not with the undulatory theory. But we have now better tests in the Canons of Induction.

In all such investigations we must take along with us

two grand principles. One of these is the principle of Cause and Effect. I believe this to be an intuitive principle, standing the tests above enunciated. I believe that when we discover anything beginning to be, we look for an antecedent producing it—a substance with power. But without entering at this place on this disputed metaphysical subject, I may take it for granted that the principle of causation is sanctioned by a universal experience, and will not be denied by any one. Many, indeed, feel that the principle may require to be enunciated anew and put in a better form since the discovery of the law of the Conservation of Energy, or the Persistence of Force, as Herbert Spencer calls it. But whatever be the best shape in which to put it, we assume in all induction that causes produce their proper effect, and that every new product or change in an old thing has a cause. One of the aims of inductive science is to discover what has caused a given phenomenon, what has produced it in the past and will produce it again. But we have need to assume more than this.

The second is the principle of the Uniformity of Nature, as it is loosely called. The principle of causation might have reigned in all nature and yet there have been no uniformity. All action in nature might have as its sole cause the fiat of God. The connection of all things would, in this case, be with God, but not with one another. The spring, with its buds and blossoms, would be produced by God, but this would give no security that the fruits of autumn were to follow. Or, again, there might be constant interferences by God with the operation of natural agents; or causal agents might work, and yet there be no such thing as the general laws, such as the seasons, which we observe and trust in. We find, instead, that the agents of nature are so disposed or arranged that they produce uniformities, not the result of any one cause, but of a com-

bination and harmony of causes, such as the periodicity of the heavenly bodies, the flow of the tides, the regular return of the seasons, the plant rising from a seed and producing a seed, the descent of the animal from a parent, its growth and its death. All these imply causation, but they require more—an adjusted causation.

But it is necessary to settle more definitely what is implied in the uniformity of nature which lies at the basis of all induction. It implies first that there is a certain number of agents acting in nature—it is not necessary for us to settle how many. Secondly, that these are so collocated or arranged—I believe, adjusted—as to produce general results called laws, which we observe and act upon and can scientifically express. Thirdly, these agents constitute nature, and there is no introduction of new agents and no interference with them in ordinary circumstances. This statement does not preclude miracles on rare occasions, these miracles not being contrary to the law of causation, for they have the power of God as a cause, but they are simply an exception to the uniformities of nature.

We thus see that there are two kinds of laws sought after in induction. The one, the primary and the fundamental, are the laws of causation. In the inquiry into these, we seek to settle the precise nature of the causes acting—what is the precise nature of the power which keeps the moon in her sphere and makes the apple fall to the ground. Or, having discovered the cause and its nature, we try to find what will be its influence and effect in certain circumstances—how, for instance, gravity will produce tides in the ocean.

Canons of Induction.—There seem to be three grand ends which men of science have in view in their investigations. One is to discover the composition of the objects around us; the second is to discover natural classes; the

third is to discover causes. There are canons which guide and guard us in each of these investigations.

I. *Canons of Decomposition.*—Almost all the objects we meet with in the world, whether material or mental, are composite. It is the aim of many departments of science, in particular of chemistry and psychology, to analyze them. This can, so far, be effectively done. There are certain rules to guide us, and these may be made more and more specific as the analytic sciences advance.

A. We must separate the object we wish to decompose from all other objects. If we wish to analyze water, we must have pure water separate from all other ingredients. If we wish to analyze intuition or reasoning, we must separate it from all associated observations and fancies.

B. When we have found the composition of any piece or portion of a substance, we have determined the composition of every other part, and, indeed, of the whole. When we have ascertained that a pint of water is formed of hydrogen and oxygen, we have settled that water everywhere is composed of the same elements. This arises from the circumstance that every substance in nature has its properties which it retains. Having detected these properties in one case, we have found what they are in all.

C. The elements reached are to be regarded as being so only provisionally. We are not sure that in any cases we have found the ultimate elements of bodies. At present it is supposed that there are sixty-four elements, but we are not sure of any one of these that it will never be resolved into simpler substances. Meanwhile the chemical analysis is correct so far as it goes. It will always hold true that water is composed of oxygen and hydrogen, though it is possible that oxygen or hydrogen, one or both, may be resolved into something simpler.

Canons of Natural Classes.—There are certain sciences

which are called by Whewell classificatory. They are such as botany, zoology, and mineralogy. We may have two ends in view in classifying; one may be simply to aid the memory by having the innumerable objects of nature put into a convenient number of groups. For this purpose we fix on certain obvious and convenient characteristics and put all the objects possessing them into one class. It was thus that Linnæus put under one head all plants possessing the same number of stamens and pistils. This arrangement, though it does not come up to the requisitions of a perfect classification, is found to be very convenient. Second, our object may be to increase our knowledge by so arranging objects that one characteristic may be a sign of others. In natural classification we should always aim at securing both these ends. There are canons which may assist us in determining when we have reached natural classes.

A. We must have observed the resemblance in many and varied cases, say in different countries and at different times.

B. We must be in a position to say that if there had been exceptions, we must have met them. These two rules guard against forming a law from a limited class of facts.

C. There are classes in nature called Kinds, in which the possession of one quality is a mark of a number of others. All classes entitled to be called natural are more or less of this description. Thus, mammals are so designated because they suckle their young; but this characteristic is a mark of a number of others—that the animals are warm-blooded, and have four compartments in their hearts. Reptiles are recognized as producing their young by eggs, but they are also marked as having three compartments in the heart, and being cold-blooded.

These canons guarantee truth. When we are able to place objects in a class, we know that they possess the properties of the class.

Canons of Causes.—The most lucid and, upon the whole, the clearest and most satisfactory exposition of these methods is by Mr. John S. Mill in his "Logic." It should be noticed that his methods relate to causes, and we have not had from him an exposition of the canons of decomposition and classes as given above. He mentions four or five methods.

A. The Method of Agreement.—In the spring season we see innumerable buds, leaves, and blossoms appearing upon the plants, and we find the common cause to be the heat of the sun shining more directly upon the earth. The canon is, "If two or more effects have only one antecedent in common, that antecedent is the cause, or, at least, part of the cause." That canon is too loose to admit of a universal application, as we may not be sure that the point of agreement we have fixed on is the only one.

B. The Method of Difference.—In the very middle of the day I find the scene around me on the earth suddenly darkened. There must be a cause. I find that the moon has come between us and the sun, and this seems the only difference between the two states—the one in which everything was bright, and the other in which it is in gloom. The canon is, "If in comparing one case in which the effect takes place and another in which it does not take place, we find the latter to have every antecedent in common with the former except one, that one circumstance is the cause of the former, or, at least, part of the cause." This method is the one employed in cases in which experiment, with its separating power, is available. It is the most decisive of all tests when the circumstances admit of its application. There are cases in which this

method is not applicable, when a sort of intermediate one may come to our aid.

C. The Indirect Method of Difference, or the Joint Method of Agreement and Difference.—The canon is, "If two or more cases in which the phenomenon occurs have only one antecedent in common, while two or more instances in which it does not occur have nothing in common but the absence of that antecedent, the circumstance in which alone the two sets of cases differ is the cause, or part of the cause, of the phenomenon." The illustration given by Mr. Mill is: "All animals which have a well-developed respiratory system, and therefore aërate the blood, perfectly agree in being warm-blooded, while those whose respiratory system is imperfect do not maintain a temperature much exceeding that of the surrounding medium; we may argue from the two-fold experience that the change which takes place in the blood by respiration is the cause of animal heat."

D. The Method of Concomitant Variations.—We want to know the cause of the rise of water in a pump or of mercury in a barometer. The ancients accounted for this by nature's horror of a vacuum, which is inconsistent with the fact that water will not rise above a certain number of feet in the pump. Torricelli and Pascal gave a better explanation when they referred the rising of the water or mercury to the weight of the incumbent atmosphere, which Pascal proved by ascending a mountain with a barometer, and finding that, as he rose higher and higher, the mercury fell lower and lower in the tube. Here we have the effect varying with its alleged cause, which is an evidence that the alleged cause is the true one. The canon is, "Whenever an effect varies according as its alleged cause varies, that alleged cause may be regarded as the true cause, or, at least, as proceeding from the true cause."

E. The Method of Residues.—A farmer knows how much grain a particular field has yielded in the past. He mixes manure with the earth on the field, and finds he has a larger crop, and he ascribes the increase to the manure. He knows what the previously existing antecedents will produce, and after subtracting this, he ascribes the residue to the new antecedent. The canon is, "Subtract from an effect whatever is known to proceed from certain antecedents, and the residue must be the effect of the remaining antecedents."

I do not need here to give anything more than the above general account of these canons, which are fully unfolded by Mr. Mill. I mention them simply to show that when they are applied they settle for us what is truth.

Reasoning in Induction.—The question is started, Is there reasoning in induction? I am sure that there is. From what has been ascertained by observation taken in a wide sense we infer something else—that there is a law which enables us to predict results.

How is it that the countryman is enabled to predict a coming storm? His father has told him, or he himself has observed that when the wind is in the East, and the clouds are thick and black, there will probably be rain or wind. Here there is evidently inference which can be stated syllogistically by the logician, the general observation being the major premise, the particular state of the wind and sky the minor, and the conclusion that there will be a storm. Every class of men, in fact all men, do thus reason on premises implied, though possibly not expressed. The laborer argues, in his own way, that there should be a rise of wages; the merchant purchases because he concludes there will be a demand for his goods. Before there were any precise rules laid down on the subject, scientific men drew true and important conclusions from common-sense principles in their own mind. The canons of in-

duction now expressed definitely enable us to put the reasoning in a more systematic form, which is a great advantage. We can now use the canons of induction (which, I believe, will become more definite and better expressed) as our majors in the syllogism of induction.

Major. When two or more effects have only one antecedent in common, that antecedent is the cause.

Minor. But the budding of innumerable plants in spring has only one common antecedent—the return of the sun to a higher altitude.

Conclusion, this one antecedent *is* the cause.

This is the method of agreement. Let us take a case from method of concomitant variations.

Major. Where an effect varies with its supposed cause, this is the true cause.

Minor. But the rising and falling of the mercury in the barometer varies with the less or greater weight of the superincumbent atmosphere.

Conclusion, the weight of the atmosphere is therefore the cause of the rise or fall of the barometer.

It should be observed that the canons, with their implied reasoning, do not guarantee to us absolute certainty, what is called apodictive truth or demonstration. None of these are certified, as first truths are, by the law of necessity; we can easily conceive any one of the ordinary physical laws not to be true universally, and we might believe so provided we have evidence. The evidence, after all, is merely a probability of a lower or higher degree, but may rise to a certainty only a little short of being absolute, and quite sufficient to justify us to put trust in it and act upon it in ordinary, indeed in all, circumstances. Such, for instance, is the proof which we have in favor of the law of gravitation. It is not demonstrative like a mathematical truth, but it satisfies the mind and is verified by constant observation.

SECTION VI.

THE JOINT INDUCTIVE AND DEDUCTIVE METHOD.

J. S. Mill argues that more progress will now be made even in observational sciences by deduction than by induction. This may be doubted. It seems to me that observation and experiment must always be the surest way of advancing research. But deduction may be joined to induction. When this is done the method may be called the Joint Inductive and Deductive. This is, in fact, the method represented by Mr. Mill as conducting to such fruitful results.

In this method the inquirer begins in the inductive method, that is, he observes facts with care and with the view of discovering a law. As he proceeds he will ever be asking whether the law is so and so, that is, devising an hypothesis. In order to determine whether this is a true law of nature, he has to examine further facts, it may be, facts of a different kind. As he acts thus, he may find he can apply deduction. He inquires what effects follow from the law in his mind, and he then compares these with the facts. If he finds these to correspond, he has a Verification of his Hypothesis. It is by combining the two in this way that the greater number of the established laws of nature have been discovered. In some cases there have been long processes, both of induction and deduction, before the law has been ascertained and adjusted. When the laws of nature are quantitative, as they commonly are, mathematics may be applied to them, and it becomes the instrument of the deduction, and often a far-reaching one, showing very distant consequences which can be compared with facts.

In the sciences of observation sometimes the inductive

element and sometimes the deductive method is the more prominent; in all cases the inductive, as I reckon, is the essential. In Galileo's researches experiment was the main instrument, but he also used mathematics. Kepler's fertile mind was always devising hypotheses, but he accepted them only as they were confirmed by observations. It would be wrong to say that Newton's method was mere induction. He had before him the observations of Galileo and Kepler, and also a measurement of the distance of the earth's surface from the centre, and he applied a powerful mathematics, created by himself, to these facts. It is a circumstance greatly to his credit that when, on having a wrong measurement of the distance of the earth's circumference from its centre, he found his theory that the moon was held in her sphere by the same power as draws an apple to the ground not in accordance with facts, he gave it up for a time, and only resumed it when it was found, on the proper distance of the earth's distance being ascertained, that the facts corresponded. In all departments of physics or natural philosophy the deductive mingles with the inductive. In optics, in thermotics, in theoretical astronomy, in mechanics, the deductive or mathematical element has a conspicuous place; but in all these sciences we have always to start with observed facts. In ethics we carry out indefinitely the laws of our moral nature; but these have been ascertained by a previous observation of that nature. In like manner, in logic we deduce consequences from the laws of discursive thought, which we have found by observing how they act in the mind. In all the social sciences there is a mixture of the two elements, sometimes the one and sometimes the other being the more predominant. Jurisprudence is forever appealing to fundamental principles, and inquiring how they apply to a given case. The science of national wealth must be

constructed mainly by the observation and collection of facts, in statistical and other forms; but there are universally operating principles ever called in. Thus it is supposed that men are usually swayed by a desire to promote their interest so far as they know it. This is certainly a powerful motive. But there are others, such as the desire for fame, for power, for society, for the beautiful, for the promoting education and religion, all actuating individuals, and the influence may be traced in the progress of nations. In chemistry the laws have to be ascertained by observation, particularly by experiment; but when principles have been discovered, such as that of affinity, they may be carried out indefinitely. Psychology, as a science, is constructed mainly by the observations of consciousness; but having ascertained certain laws, such as those of the association of ideas, we can explain how they affect our beliefs and feelings. In pedagogics, or the science of teaching, we must carefully observe the ways of children; but, in doing so, we discover their actuating motives, such as the love of knowledge, the love of play, the love of approbation, which have to be taken into account in constructing our methods of instruction and discipline. In æsthetics there are ascertained laws of taste which must be taken along with us in the construction of the science. In all departments of natural history, observation must play the most important part; but there are laws of life and of form to guide biologists in all their investigations.

The principles from which we deduce conclusions are of two kinds. Some are self-evident or demonstrative. Such are moral laws and maxims. These are assumed, and are applied extensively and constantly in history and in all the social sciences, in all sciences which deal with motives and character. Of this description is the maxim that men are likely to be happy and comfortable when

they are moral. To this same class belong all mathematical propositions founded on axioms. These self-evident truths are seldom formally enunciated, they are simply assumed and applied. So far as science uses them, it is very much employing the joint Dogmatic and Deductive method. But there is a second kind of principles used in deduction even more extensively; these are acknowledged truths and wise saws established by a large induction. For example, any one may now assume the law of gravitation. In optics it is allowed that the angle of reflection is equal to the angle of incidents, and from this a great many particular truths may be drawn. In chemistry it is taken for granted that the elements combine in certain proportions, and from this a multitude of consequences follow.

In this joint method the induction is tested by the canons of induction and the deduction by the rules of reasoning.

Hypotheses and Verification. Consilience of Inductions.—"Hypotheses non fingo," said Newton, meaning, perhaps, that he introduced no fictitious agency, but merely *veræ causæ*, such as existed in nature; or, more probably, that he accepted no truth till it was established. Since Newton's time, especially within the last age, hypotheses have played a very important part in all departments in which the laws have not been settled, as, for example, in electricity and biology. The investigator is bent on knowing what laws certain phenomena follow. But in nature divers agents are mixed up with one another, and we cannot determine what they are by a loose inspection. As he observes tentatively, he makes a supposition suggested by the facts as to what the law should be. When he notices the descent of plants and animals, he says to himself, Let us suppose the law to be that of development or heredity. He has now a specific end to work for, and he observes

and collects facts, and inquires whether they agree with the hypothesis he has formed. If he finds that many of them do so, he has a probability, and is encouraged to proceed; and if the hypothesis explains a large body of events it rises to the rank of a theory. When it takes in all the facts bearing on the particular case, and no exceptions can be discovered, it is regarded as a law of nature, which, however, may require to be modified and adjusted before it suits all the facts, and so becomes the true law. This process is called

The Verification of Hypotheses.—When first suggested the supposition may have little to support it, and there may seem to be facts opposed to it. But if it is the correct one, there will come confirmations from a variety of quarters, difficulties will disappear, and the seeming exceptions may corroborate it. The hypothesis started is that light consists in vibrations, not a very probable supposition beforehand, but then it is found to explain one set of phenomena after another, till at last it seems to account for everything, and is counted as an established law. Or the hypothesis is that of the conservation of energy, or that the amount of energy in the world, real and potential, cannot be increased or diminished. On the first consideration of this view, obvious objections will present themselves. We strike with a hammer upon a piece of iron till our strength is exhausted, and it looks as if force had been expended and lost. But, on further inquiry, we detect the energy that had gone out of the body to be conserved in the molecular motion or heat of the metal.

Hypotheses, I rather think, must be resorted to in the early stages of the investigation of every sort of phenomena. They are simply tentatives, and most of them may have to be abandoned. They may or they may not be announced: they may, in the first instance, be simply

guesses, and only a few or one of them prosecuted to any great extent. The law of gravitation was for a time only an hypothesis, taking the erroneous form that matter attracts other matter, not according to the square of the distance, which is the true law, but according to the distance. Hypotheses are necessary, but are to be carefully watched and limited.

First.—The hypothesis must be suggested by the facts and not be feigned by the mind; this may be the meaning of Newton.

Second.—It must be regarded as a mere hypothesis till it is established by the criteria applicable to the department. We are much troubled in the present day by hypotheses being represented as established laws.

Third.—The hypothesis is to be abandoned when it is found that there are facts inconsistent with it. It requires much courage to abandon an hypothesis which has long been cherished and perhaps published to the world.

Fourth.—It is established as a law when it explains all the phenomena bearing on the subject and is not contradicted by any known fact.

It is a powerful confirmation of an hypothesis when it enables us to predict occurrences. If the alleged law be the true one, the facts will correspond to it in the future as in the past, and as they fall out will tend to prove that the hypothesis is a sound one. Dr. Whewell has shown that the evidence in favor of our induction is of a much higher and more forcible character when it enables us to explain and determine cases of a kind different from those which were contemplated in the formation of our hypothesis. "Thus it was found by Newton that the doctrine of the attraction of the sun, varying according to the inverse square of the distance, which explained Kepler's third law of the proportionality of the cubes of the distances to the

squares of the periodic times of the planets, explained, also, his first and second laws of the elliptical motion of each planet, although no connection of these laws had been visible before. Again, it appeared that the force of universal gravitation, which had been inferred from the perturbations of the moon and planets, by the sun, and by each other, also accounted for the fact, apparently altogether dissimilar and remote, of the precession of the equinoxes." He designates this process as the Consilience of Inductions. He declares: "No example can be pointed out in the whole history of science, so far as I am aware, in which this consilience of inductions has given testimony in favor of an hypothesis afterward discovered to be false."

SECTION VII.

CHANCE.

In one sense there is and can be no such thing as chance, that is, an event without a cause or without a purpose. Every occurrence has a cause in God. Not only so, but in the ordinary affairs of this world it has a mundane cause. Further, it falls out according to the uniformity of nature.

But there are senses in which there is a chance in our world. The oldest definition of chance (τύχη) was by Anaxagoras, who makes it an event whose cause cannot be discerned by human reason (λογισμῷ). This account needs only to be a little expanded and made more definite. There are occurrences of which the cause or the law is unknown, and, in consequence, we cannot anticipate their occurrence. This may arise from the cause being utterly unknown to us. More frequently it arises from the com-

plexity of nature, from there being a number of agents working, or from the nature of their operation. We may know all the agencies at work, but we cannot tell how they are working. In all cases the events do not recur with such regularity as to constitute a law. There was a time when eclipses were regarded as coming according to no law, and men, following the law of causality, referred them to a deity. When these causes were discovered they were found to have periods, and astronomers could predict their recurrence, and they were viewed in a different light. Till lately meteors were supposed to appear capriciously, but now showers of them are expected at certain seasons of the year, and nobody ascribes them to chance. When we shake a die in a dice-box, we are acquainted with the mechanical law which it obeys in its movements, but we cannot say which side will cast up. We know, in a general way, what physiological agencies produce death, but we cannot predict at what precise time any man will die.

Still, even in such cases a certain kind and amount of truth may be had, and this from the circumstance that the event proceeds, after all, from causes which operate regularly and from there being a limited number of causes. We find that, given a sufficient number of trials, each side of the die will come up the same number of times; if any side comes up more frequently than another, we argue that the dice have been loaded. We do not know when any one man will die, but we can ascertain what number of people will die in a given time in a community.

In such cases we can strike an average, and we can foretell average results and estimate the probability of a given event. When we speak of the probability of an occurrence, we are not to understand this as implying the uncertainty of the occurrence considered in itself. The event, say the death of a person on a certain day, may be abso-

lutely sure, owing to causes operating. We can conceive that there are higher intelligences to whom it would not be uncertain. We are sure that it would not be so to the view of the Omniscient. It is so to us because of the limited nature of our faculties and of our knowledge of the causes operating. Were we cognizant of all the antecedent circumstances we might in many cases be able to predict the result. It is because of our ignorance that the event is uncertain to us. The probability or improbability is not in the event which we have for expecting it; it is subjective and not objective.

In all cases we must have certain data gained by observation and yielding a general average. In some departments we can express numerically the probability or improbability of the particular occurrence. An event reckoned impossible may be represented by 0, an event certain to happen by 1. All degrees of probability may be denoted by the fractions representing value from zero to unity. The probability of an uncertain event is represented by the number of chances favorable and unfavorable. Thus the casting up of a head or a tail being 1, and the chances against it being 2, the proper chance is one-half. The tables that have been prepared for life insurance companies have been very elaborate, but need not here be given.

There is another sense in which it may be said that there is such a thing as chance. There cannot be an occurrence without a purpose on the part of God, who has ordered the causes producing it. But there may be a concurrence without a design. It is by chance that certain rocks take the form of the face of Napoleon or Wellington. I do not know that there was any purpose designed or effected by so many men of genius being born in the year 1759, or by Cervantes dying on the same day as Shakespeare

died. There are certain minds that take the keenest interest in observing such coincidences and discover a deep meaning in what is in itself meaningless; for example, connecting a calamity with the spilling of salt at a table, or from thirteen persons meeting at that table. On the other hand, when there is an immense congregation of agents that are independent, to produce an evident benevolent end, for instance, of vibrations of light of coats, and humors, of rods and cones, to enable us to see through the eye, there is evidence of design, the chances being all against such a concurrence.

SECTION VIII.

PSYCHOLOGY.

Here, as well as in all the physical sciences, we have to begin with the observation of facts. There is, however, an important difference between the two departments. The facts in physical science are obtained by the senses; whereas, in mental science, the observing agent is self-consciousness. It is only thus we can find out what any psychical act is. An examination of the nerves and brain may show how a mental state arises, but can give no idea of the mental act itself, say of a sensation, a recollection, an imagination, of moral approbation, of emotion or wish. But in making consciousness our witness we have to allot to it a large province. We must include in it not only immediate introspection, but also the observation of the mental acts of others, as disclosed in their words, their writings, and their deeds. We cannot, indeed, look directly into the bosoms of our fellow-men so as to ascertain what is passing within, but we can gather what this is by the

expression of it, which, be it observed, we can understand because we are conscious of our own acts. History, biography, travels, plays, novels, newspapers, and especially conversation and familiar letters, may all show us human nature quite as much as they do external incidents. Without these supplements we should have a very contracted view of the mind by inspection of our own souls.

The individual facts are made known in this way. The criterion of consciousness is in itself, it is self-evidencing. As we observe the facts we distinguish between those that differ and co-ordinate them into laws. The criteria of the laws are much the same as those of physical science.

Psychology proceeds on the same two fundamental principles as physics. It is seeking for causes. Without determining the question of the freedom of the will, we may confidently affirm that causation, that the persistence of force, rules in the mind as it does in the body. Certain antecedents are sure to be followed by certain consequences. The orator urges the considerations which may persuade those whom he is addressing and lead them to action. The poet raises up images that please and elevate the mind. The father and the teacher inculcate principles which may guide the young in all their future lives. Investigators in this department have been seeking to discover faculties and the rule and mode of their operation. The early Greeks found sensation, the discursive power, and reason. Aristotle had in the soul the nutritive power sensation, memory, phantasy, and above these, the reason, active and passive. In all ages there has been a grand distinction drawn, in a loose form, between the intellect and the will, the cognitive and the motive powers. Everybody talks of the memory, the judgment, of reasoning, and of sentiment and feeling, of the power of abstracting, generalizing, distinguishing, of loving and of hating.

There seem, also, to be laws of uniformity in mind. It does not appear that in the association of ideas one idea is the cause of that which succeeds; that when height suggests hollow, and the dwarf suggests the giant, and prosperity, adversity, and a portrait the original; that when we count up from one to one hundred, there is a causal connection between the ideas—they are the joint effect of a number of causes. In the science of psychology we seek to discover these laws, such as the law of habit, the connection between the idea and the feeling raised by it, the kind of acts which conscience approves of.

Now, there may be criteria of these laws, both of causation and uniformity. These have not been so carefully enunciated as those of physical science. I believe that, *mutatis mutandis*, they may be considered as very much the same.

The Method of Agreement.—Washington is named, and we find the mind following a certain train. We think of his education, his training, the revolution, his battles, his character, all of which have been previously in the mind together, and we reach the law of contiguity, that when ideas have been in the mind at the same time, when one comes up the others are apt to follow.

The Method of Difference.—We see a portrait of Washington for the first time. The two, the portrait and Washington, were never before in the mind together, yet the portrait calls up Washington, and the law is, things that are related, especially things that are like, recall each other.

The Joint Method of Agreement and Difference.—There are days in which we find that we can easily recall the things we would remember, other days in which they will not come up. The difference is in the time: that in the first few days our brain was in perfect health; in the

other we had a headache, and we discover that the state of the brain affects our associations.

Method of Concomitant Variations.—When we are interested in an event known to us, we are apt to think of it more frequently, and we conclude that feeling, as a secondary law, influences our associations, and according to the feeling with which it is accompanied, so do ideas come up.

Method of Residues.—On contemplating kind actions, we feel a pleasure which can be explained by our social feelings; but we find that on contemplating some of these we have a feeling of moral approbation. This cannot be explained by the mere social feeling, and we have to call in a moral principle.

SECTION IX.

NATURAL THEOLOGY.

Attempts have been made to conduct this science on the joint dogmatic and deductive method, but, in my opinion, without much success. It has to deal with facts, the existence of God and the immortality of the individual soul, and therefore must have an inductive or observational element. I have my doubts whether, from a mere idea or principle in the mind, we can argue the existence of the living God. It should proceed, I reckon, mainly in the joint inductive and deductive method. It looks at God's works within and without us, and, discovering wonderful mutual fittings, means and end, traces of love and just government, it rises to the belief in a being of power, wisdom, benevolence, and justice. The inductions are collected in such works as Ray's "Wisdom of God," in Paley's

"Natural Theology," in the Bridgewater treatises, and the ordinary works of natural religion.

But there are deductive processes involved. The premises here are supplied mainly by *à priori* principles or by intuition, all to be justified by the criteria of First Truths. In the mind of man there are high and deep truths in the germ, all capable of being developed and actually working in the mature man, being called forth by the circumstances in which he is placed. There is the principle of causation, requiring us, on a new thing or a change appearing, to seek for a cause. This can stand the tests of intuition, being self-evident, necessary, universal, in our very nature and constitution, and it leads us to believe that where there are traces of design there must be a designer. There is a moral power within us, with its law and its obligations, implying a law-giver. We have not an adequate idea of infinity, but we believe that there is something beyond our widest idea or concept, something to which nothing can be added, and we are led to apply it to the powerful, the good and holy One.

We are entitled, we are required, to trust and follow these principles. They are elements and the highest elements of the reason with which we are endowed. We begin with trusting the senses, and find, as we do so, constant confirmations in our daily experience; what appeared at first to be realities we discover to be more real as we bring one sense after another to bear upon them, and find that meat nourishes us and pure air refreshes us, and the due use of the good things of this world prolongs life. We should confide in the same way in our higher ideas and beliefs, and as we do so we find them expanding and elevating the mind, opening grand vistas which look beyond the seen and temporal into the unseen and eternal. If we do not follow our lower instincts, if

we do not eat and drink, our bodies will become feeble and die; and if we deny our higher reason, our souls will lose their freshness, vigor, and aspirations.

But when we would construct the argument, indeed, in all scientific investigations and in all true philosophy we must be careful to ascertain the exact nature of the intuitions or intuitive reason we call in, and only use them accordingly. Those who neglect this are sure to present them in an extravagant form or make a perverted use of them. This has been done by the mystics of the East and of mediæval times, indeed, of all ages. Almost always they have got a glimpse of a reality, but they have seen it only under partial aspects, and they have shown it to us through a cloud, or irradiated it with reflected light, and have represented it to us as vision, inspiration, and ecstacy, whereas it is only one of the higher elevations of our nature.

All our profound thinkers have seen these truths, but have not always properly represented them. We may hold with Plato that there is a grand, indeed, a Divine idea; but I wish that idea, as in the mind, carefully examined, and its forms or law exactly determined, and it is for inductive science, and not speculation, to tell us what are the types which represent it in nature. I hold with Aristotle that there are formal and final as well as material and efficient causes in nature; but it is for a careful induction to determine the nature of these and to show how matter and force are made to work for order and for ends. I am as sure as Descartes, and as Augustine and Anselm were before him, that there is in the mind a germ of the idea of the infinite and perfect; but we must show what is the precise nature of the idea, so as to secure that we draw only legitimate inferences from it. I discover, as Leibnitz did, a pre-established harmony in nature, but it

consists mainly, not in things acting independently of each other, but in the harmony produced by things acting on each other. I attach as much importance to experience as Locke did, but I maintain that observation discovers that the intuition (which he acknowledged) looks at principles in the mind prior to all experience. I allow to Kant his forms, his categories, and his ideas, but their nature is to be discovered, not by criticism, but by induction, when they will be found not to superinduce qualities on things, but simply to enable us to perceive what is in things. I believe with Schelling in intuition (Anschauung), but it is an intuition viewing realities. I hold with Hegel that there is an Absolute, but I believe that our knowledge, after all, is finite, implying an infinite, and that the doctrine can be enunciated so as not to issue in pantheism. I turn away with scornful aversion from the pessimism of Schopenhauer and Von Hartmann, but I believe they have done good by calling attention to the existence of evil, to remove which is an end worthy of the labors and sufferings of the Son of God. I believe with Herbert Spencer in a vast unknown above, beneath, and around us, but I rejoice in a light shining in the darkness and revealing the known. I believe in the gems so rich and varied which the higher poets have left us as a rich inheritance; but before they can enter into philosophy they must be cut and set, and it will require a skilful hand to adjust them, and when they are cut it must be as skilfully as diamonds are, and this only to show more fully their form and beauty.

SECTION X.

THE SUPERNATURAL.

We have to posit the Supernatural as the origin of the natural. This we do on the principle of cause and effect. We discover in nature evidences of its being an effect. It has, as Sir John Herschel says, the appearance of "a manufactured article." This is seen particularly in the adaptation of one thing to another all throughout nature. We argue a cause above and beyond nature, and this is Supernatural.

Miracles.—It is asserted that in the very midst of the natural occurrences there are events which cannot be accounted for by natural agents. These are called miracles. Of most of these, when we examine them, we find that they cannot stand our criteria; they are the products of superstitious fears and of credulity. But there are events recorded in the Old and New Testaments which are worthy of having the tests of truth applied to them. These are not to be regarded as occurring without a cause. They are not inconsistent with the intuitive conviction of causation. They have a sufficient cause in that power in which nature originated. We are only following out the principle of causation in arguing thus. We rise to a supernatural cause because there is no agent in nature adequate to produce such occurrences as the resurrection of Lazarus or Jesus.

I would not describe miracles with Hume, as "violations of the laws of nature;" but they cannot be accounted for by these laws. They do not fall in with that general fact that every event has not only a cause in God but a cause in a physical agent. As physical agents cannot produce them, we argue that they are effected by the immediate power of God. Further, they are

not in accordance with the uniformity of nature. It is not in conformity with this that fishermen and mechanics of Galilee should produce our Lord's discourses. They accomplish their ends, in guaranteeing revealed truth, because they are above the causes and laws of nature.

The evidences of Christianity are of two kinds: one internal and the other external. The external are facts attested by witnesses, whose depositions are to be tested by the criteria of testimony. The others are those derived from the suitableness of the truth revealed to our nature, moral and spiritual, to our sinful state and our wants. Take the Sermon on the Mount as so conformable to our moral nature. Take the life and character of Jesus, so perfect, so full of love in a world of sin and selfishness. Take his sufferings and his death, so fitted to accomplish their avowed end, that is, make atonement for sin.

There is proof of a uniformity of laws in nature, not from intuition, but the combined result of the experience of all times and countries. But it can be shown that there is a like uniformity in revelation, in its types, its prophecies, its doctrines. Its miracles are of a certain kind. Those of our Lord were mostly the healing of diseases, the cure of evils. Each one is part of a system; each part bearing up the others and the whole. By the one uniformity we are sure that every event is according to law. By the other we find a conformity in a whole supernatural system.

SECTION XI.

CONCLUSION—LIMITS TO HUMAN KNOWLEDGE.

The aim of this treatise has been to show that the human mind is capable of reaching knowledge, and that it has tests to determine when it has done so. I have faced the agnostic, but have not entered into a wrestling with him, which would be endless, because he refuses to take a form by which I may lay hold of him. I have pursued a more effectual method. I have shown objects where he assures us that there is nothing. It is in this way we can command assent and gain assurance.

I have proceeded on the idea that there is a difference in the certitude of truths. Some I have shown are self-evident, necessary, and universally held, and therefore certain beyond doubt or dispute; others are only probable, some with only a slight balance in their favor, others rising to certainty. This is not so much a difference in the truths as a difference in the evidence to us. To God and to higher beings, the one kind may be as certain as the other. We cannot tell whether there will or will not be a good harvest next year. But to Omniscience it may be as certain that there is to be a good harvest as that all the angles of a triangle are equal to two right angles. It is of vast moment that we should know what kind of evidence we have, and what the validity of the evidence which we have in favor of any proposition we are required to believe, whether it is demonstrative or merely probable, and if only probable, what the degree of probability. It is also of moment that we should note what kind of truth admits of apodictic and what of only probable proof. It is vain to seek for demonstration in every kind of investigation. We can have such, as I reckon, only when we have

self-evident truth. But, then, it can be shown that inductive truth can rise to certainty. I doubt much whether we have immediate evidence of the existence of God as we have of the existence of ourselves. But we have quite as valid proof of the existence of God as we have of the existence of our fellow-men; in both we have a fact, the acts done, and we rise up by the principle of causation to a cause. The criteria of truth which I have been furnishing should assist us in all such investigations.

Man's knowledge is increasing and must continue to increase. His generalizations widen as his knowledge increases and take in more and more objects. He is constantly gaining more premises which lead to farther conclusions. One discovery leads on to another; one chamber opened shows us the door which opens into a second. Davy proved the correlation of electric and magnetic forces, Oersted of electric and magnetic, and at last the grand doctrine disclosed itself to a number of investigators, particularly to Mayer, that all the physical forces are correlated.

But man's power of discovering truth is and ever must be limited. First, there are limits to his mental powers. He has only five original inlets of knowledge into the material world. Had he fifty senses instead of five he might know vastly more. Then, his power of working on the materials required by sense and consciousness, his memory and his understanding, are also limited. Some men can discover more truth than others, and it is conceivable that there may be higher intelligences who see farther into the nature of things than the most far-sighted of men. Secondly, every man's individual experience is limited, and the same may be said of the experience of the race—it is confined within very stringent bounds.

Man can discover a vast amount of truth, speculative

and practical. We have enough revealed to exercise our faculties, to expand and elevate the mind, and to serve for all the purposes of the duty we owe to God, to ourselves, and our fellow-men. Every truth known leads, however, into the unknown. But this is to tempt us to penetrate into the unknown region that we may know it.

As we do so we shall find that there are things beyond our ken in a region beyond, above, or beneath us, and we must be content to allow them to lie there. We know as much as to know that there are truths which we cannot know. We see the objects within our proper range of vision, but we also see the darkness that encompasses them. "We know in part." Yes, we know, but we know only in part.

We who dwell in a world "where day and night alternate;" we who go everywhere accompanied by our own shadow—a shadow produced by our dark body, but produced because there is light—cannot expect to be absolutely delivered from the darkness. Man's faculties, exquisitely adapted to the sphere in which he moves, were never intended to enable him to comprehend all truth. The mind is in this respect like the eye. The eye is so constituted as to perceive things within a certain range, but as objects are removed farther and farther from us they become more indistinct, and at length are lost sight of altogether. It is the same with the intellect of man. It can penetrate a certain distance and understand certain subjects, but as they stretch away farther they look more and more confused, and at length they disappear from the view. And if the human spirit attempts to mount higher than its limited range, it will find all its flights fruitless. The dove, to use a well-known illustration of Kant's, may mount to a certain height in the heavens; but as she rises the air becomes lighter, and at length she finds that she

can no longer float upon its bosom, and should she attempt to soar higher her pinions flutter in emptiness, and she falters and falls. So it is with the spirit of man: it can wing its way a very considerable distance into the expanse above it, but there is a boundary which if it attempts to pass, it will find all its conceptions void and its ratiocinations unconnected.

Placed as we are in the centre of boundless space and in the middle of eternal ages, we can see only a few objects immediately around us, and all others fade in outline as they are removed from us by distance, till at length they lie altogether beyond our vision. And this remark holds true not only of the more ignorant, of those whose eye can penetrate the least distance; it is true also of the learned; it is perhaps true of all created beings that there is a bounding sphere of darkness surrounding the space rendered clear by the torch of science. Nay, it almost looks as if the wider the boundaries of science are pushed, and the greater the space illuminated by it, the greater in proportion the bounding sphere of darkness into which no rays penetrate, just as (to use a very old comparison) when we strike up a light in the midst of darkness, in very proportion as the light becomes stronger so does also that surface dark and black which is rendered visible.

II

ENERGY; EFFICIENT AND FINAL CAUSE

ENERGY.

EFFICIENT AND FINAL CAUSE.

INTRODUCTION.

The principle of cause and effect is involved in most of the processes by which we discover truth. True, there are verities which are perceived by intuition, that is, in looking upon the objects, such as that I exist and that material things exist. But it is only a small portion of our knowledge that is obtained by primary and direct inspection. In the case of other and derivative truths causation is implied, if not in the whole, at least in the greater number of them.

The principle has a place in the great body of our convictions as to the past. I do not see that it has any part in memory which is instinctive, but it has in all those which we reach by a process. Thus, we believe that there has been a battle at a certain place, a flood at a particular spot on a river, a fire in a dwelling, because we discover effects, which we argue imply a cause. Thus, we argue that certain strata in the earth's surface are the deposits of an ancient ocean, and that other portions have been thrown up by a volcano. Even in regard to events which we believe on human testimony, we assume that the actors have been swayed by the same motives as men now are.

It will be allowed more readily that our reasonable ex-

pectations as to the future depend so far on this principle. We argue, whether we are conscious of it or not, that the causes now operating in physical nature and in men's minds will act in the future as in the past; that these colleges and schools will continue to produce a high mental cultivation; that these improved modes of agriculture will produce a richer crop, and that the abuses in certain old countries will, in the end, produce a revolution like those of France and America.

The principle is involved in the common arguments for the existence of God. True, those who believe with Schleiermacher that God is perceived by direct intuition do not need this premise. But the proofs commonly urged, for example, that from the adaptation of one thing to another to accomplish a good end, and that from the high ideas in the mind of the infinite the perfect proceed, as has been shown by Kant, on the principle of causation; these collocations and aspirations imply a designing mind to produce them.

Causation is thus one of the bonds which connect the present with the past and the future, and the whole with God as the Great First Cause. If this be so, it is surely desirable, it is indeed of vast importance, to have the nature of cause and our belief in it accurately unfolded, and brought into consistency with modern science. David Hume, in establishing his philosophical scepticism, labored with all his might to loosen the causal connection. In the defence of truth this principle comes next in order to that of the Criteria of Truth.

SECTION I.

PHYSICAL CAUSATION.

The subject will be made clearer by carefully distinguishing Causation Objective and Subjective: that is causation in itself whether we observe it or no (a spark will kindle gunpowder without our taking notice of it), and the principle in the mind which leads us believe in it.

I am not singular in holding that the whole subject of Cause has become confused in the minds of men, especially educated men, and that the time has come for reconsidering it in the light which recent investigation furnishes. In our day two or three doctrines have been propounded and, I believe, demonstrated, which require us to review and revise the doctrine of causation, more especially in its relation to Force, Energy, and Power.

I.

There is a duality or plurality in Causation, that is, there are two or more acting bodies in all physical causes. There were thinkers who had a glimpse of that doctrine from an old date. Aristotle spoke of a *συναίτιον* which Sir W. Hamilton translates Concause.[1] But this truth was first clearly enunciated by Mr. J. S. Mill (*Logic*, Book IV., Chap. V.). "The statement of the cause is incomplete unless in some shape or other we introduce all the conditions. A man takes mercury, goes out of doors,

[1] Sextus Empiricus speaks, III. 15, of *συναίτιων, συνεργόν, συνεκτικὰ*, all pointing to joint action.

and catches cold. We say, perhaps, that the cause of his taking cold was the exposure to the air. It is clear, however, that his having taken mercury may have been a necessary condition of his catching cold; and though it might consist with usage to say that the cause of his attack was exposure to the air, to be accurate we ought to say that the cause was exposure to the air while under the effect of mercury."

The doctrine had occurred to me before I read Mr. Mill's "Logic;" but as he published it first, I do not claim any credit in it. As approaching it, however, from a somewhat different direction, I believe I can make it more explicit and comprehensive. In all physical action there are two or more bodies, molecular or molar; at the present stage of science I ought to add that the body may be the ether in which the undulations of light take place. Now the cause—by which I mean that which invariably has produced the effect, and will invariably produce it—consists in the mutual action of two or more bodies; that is, their action on each other. Thus, in the case adduced by Mr. Mill, the true cause of the effect, the cold, was not the air alone or the body alone, but the air and the body under mercury. Without the concurrence, or rather the joint action of the two, the effect would not have been produced. It is the same in all other cases. A ball at rest is struck by a ball in motion; the one ball is made to move, the other has its motion stayed; the cause consists of the two balls in a certain state, and the effect the balls in another state. A picture-frame falls from a wall and breaks a jar standing on a table below; we say that the frame, or rather the fall of the frame, was the cause of the fracture of the jar. But the true cause, that which forever will produce the same effect, is the frame falling with a certain momentum and the brittleness of the jar.

Had the frame come down with less violence, or the jar been stronger, there might have been no breakage. In most cases of action a considerable number, in some a vast number and variety of agents combine to produce the result. Take the sprouting of a flower in spring: in the cause there are the increased heat and light of the sun, the state of the plant in the earth, and the state of the soil. Without the concurrence of all these the effect would not be produced.

II.

Secondly, there is a duality or plurality in the effect. This is a further truth which Mr. Mill has not expounded, but which occurred to me as I was thinking out the doctrine which Mr. Mill preceded me in unfolding. It follows from Mr. Mill's doctrine when it is properly understood, and seems to me to be quite as certain, and it is fully more important and of wider range in its applications. Thus, in Mr. Mill's illustration the cause was the state of the atmosphere and the body as affected by mercury; the effect was the same atmosphere insensibly changed in temperature, and the body under a cold. In the second case the true cause consisted of the two balls, one in motion striking the other at rest; the effect (which would be forever produced by the same cause) the ball which was at rest moving and the ball which was in motion at rest. In the third case the cause was the picture-frame with a certain momentum striking a jar of a certain structure; the effect was the frame losing part of its momentum and the jar broken. In the case of the plant germinating there must have been in the effect changes—it may be incapable of measurement—in all the agents acting as the causes in the sun's heat and light absorbed in the earth and in the plant sprouting.

Taking these views with us, it may be of great use to have appropriate and definite phrases to express them. The word Cause, that which invariably produces the effect, should be reserved for the combination of agencies producing the result. The cause of the man's taking cold is not merely the cold atmosphere or his frame being affected by mercury, but in the two acting on each other. The word Effect should in like manner be applied to the combined result, and comprises the change in the air as well as the colded affection of the body. In the other illustrative cases it implies the movement of the one ball and the staying of the other; the loss of momentum in the picture-frame as well as the breaking of the jar; and the change in the rays of heat and light coming from the sun as well as the germinating of the plant.

As causes are dual or plural, it is proper to have phrases to express the parts. The law is often stated that the same cause always produces the same effect in the same circumstances. But in order to clearness and accuracy it is essential to specify what are the circumstances; it is in fact necessary to put them into the cause, as without them the effect would not follow. In order to the germinating of the flower there is not only the state of the plant and soil, but the additional heat of the sun. All the acting parts may be called agents or agencies, without specifying what they are. They are bodies in a certain state acting on other bodies.

Very often one of these agents is more important in itself, or in our estimation, or for our present purpose, than the others; this is designated pre-eminently the cause, and little or no evil may arise from this provided always that it be understood that this agent needs one or more co-operating agents which are parts of the full cause. If it be said that the cold air was the cause of the man being

colded, it was because his body was disposed toward such an issue by mercury. It is not easy, or perhaps even possible, to lay down a rule as to which of the agents should be called the special, the main, or the prominent cause, for the cause consists in the mutual action of the whole. When man is working he often calls in one agent to produce an intended effect. If he wishes to kindle a heap of straw, the agent he attends to is the fire he applies; if he wishes a good crop from his ground, he looks to the manure; if he wishes to be cured of a disease, he selects his medicine; though in all such cases there is need of co-operation in the state of the straw, or of the ground, or of his bodily frame. In nature there is often one agent that is particularly potent. When a tree is struck by lightning it is the electricity that is specially noticed, though the structure of the tree had also to do with the effect produced.

Fixing on the agent that is most prominent in itself or in our eyes as the cause or special force, then the co-operating agent may be called the *Occasion*. This phrase is specially applied to circumstances which cast up to call forth a power into exercise, or to work along with causes steadily operating. Thus, that ill-constructed house fell on the occasion of a storm arising. I was prompted to write a letter to a friend by my affection; but the occasion was his suffering a severe loss; the two actually called forth the letter. Malebranche was the philosopher who brought the phrase "occasional cause" into general use. He represented the will of God as the true cause of all creative action, but the volition of man might be the occasion of the forthputting of the Divine Power. Thus, when I move my arm the true cause is the Divine Will, but my purpose is the occasional cause. In such a case we may allowably give a prominence to the Divine Power, but it should be noticed that while one of the agents is the important one, the

other or others, the action of the brain and nerves, are necessary to the production of the precise consequence, which will not follow without the co-operation.

We are thus enabled to give a philosophical explanation of what is meant, or rather what should be meant, by *Condition*, a phrase so often used vaguely and illegitimately in the present day in its application to physical operation. In order to be rid of an agent or to drive it into a corner, it is said that it is simply a condition. In order to the production of a given effect, a certain agent is fixed on as producing an end, the other or others are represented as simply conditions. As proving design we show that animals with a stomach for digesting flesh have also claws and strong muscles to catch and hold their prey. But an attempt is made to do away with the force of the argument by urging that these adjuncts are merely the conditions of the machine working. But properly understood the argument lies in the circumstance that the co-operating conditions have met. The presence of strings in a harp is a condition of it producing music, but the evidence of design is in the presence and combination of the necessary strings.

We may legitimately and conveniently use such phrases provided we understand them ourselves and let our readers or hearers understand what we mean by them. But it should be distinctly explained that all the agents acting, whether circumstances, occasions, or conditions, constitute the cause without which the effect would not follow.

It is needful to make like explanations and come to the same understanding as to the Effect. In all cases of physical action the effect is also dual or plural; it consists of two or more agents changed—I hope to show the same agents as are in the cause. These constitute what has been, and what will always be, produced by the cause. But it often happens that a special end is contemplated

when we set an agent or agencies aworking; and when this is effected it is regarded as the proper or the only effect. But there may be other consequences which we did not consider or look for, or which we regard as minor or irrelevant ones. We wish for a shower to refresh the ground; as it falls it accomplishes that end, but it may also so swell a stream that it works destruction as it overflows its banks. A new machine is invented which produces a greater amount of work, but it throws a number of people, who followed the old methods, out of employment. It is desirable to have a phrase to denote these secondary effects, as they are regarded; and they may be described as *Concomitants*, or more expressly as *Incidents* or *Incidentals*. Perhaps some would call them Accidents, and they may be so called as they were not intended, as when one fires an overcharged gun and is wounded by its striking backward. But these accidents are quite as much caused by the agents as the others that were expected. In all cases the effect properly understood consists of the whole of the agents that have been acting put in a new state. Any one who sets new agencies agoing, say starting a new trade or passing a new law, is bound to look not merely to one but all the consequences that must follow.

III.

The Conservation of Energy.—It has long been known and acknowledged that the sum of matter in the cosmos is always one and the same. We burn a piece of paper and it disappears from our view, but it is not annihilated. One portion of the matter has gone down in ashes, the other has gone up in smoke, and it is conceivable we might bring the scattered particles together, and they would become the original paper.

Imperious Cesar dead and turned to clay
Might stop a hole to keep the wind away.

It has been proven in our day that the same is true of the energy of matter. This doctrine was anticipated by several philosophic physicists,[1] but was established in our day by Mayer, by Joule, by Grove, and others. According to it, the sum of energy potential and actual capable of being brought into operation or in operation, is always one and the same. It cannot be increased and it cannot be diminished by any human, indeed, any mundane agency. The doctrine is thus stated by Clerk Maxwell: "The total energy of any body or system of bodies can neither be increased nor diminished by any mutual action of these bodies, though it may be transformed into any one of the forms of which energy is susceptible." The amount of energy is constant if unaffected by any agent external to itself. If acted on from without the energy will be increased by what has been communicated. If it acts on bodies without, the energy will be diminished by the work done. When any portion leaves one body it passes into another. If two balls strike each other, they have the same amount of energy before they strike and after they strike, though the energy may be decreased in one and increased to the same extent in the other. When the energy dis-

[1] It has been shown (Thomson and Tait's Natural Philosophy, § 269) that Newton had seized the principle which leads to the doctrine, "Work done on any system of bodies has its equivalent in the form of work done against friction, molecular forces or gravity if there be no acceleration; but if there be acceleration part of the work is expended in overcoming resistance to acceleration, and the additional kinetic energy developed is equivalent to the work so spent." It can be shown, I think, that Leibnitz also approached the doctrine from another side. In his letters to M. L'Hospital he speaks of "l'egalite de la cause et de l'effect," and says, "la force se conserve toujours." This points to the principle. Mayer, who did as much as any other man to establish the doctrine, also speaks of the effect being equal to the cause.

appears in one form, say in mechanical force moving a mass, it appears in another, say in heat, which is molecular motion.

It is an integrant part of this doctrine that the physical forces are all correlated, a truth beautifully expounded by Grove in his "Correlation of the Physical Forces." The energy may take various forms—say the purely mechanical, the chemical, the electric, the magnetic—perhaps also the gravitative, which may be a somewhat weak form of the correlated forces. These forms are capable of being transmitted into each other, and this in definite quantity: so much mechanical force into so much chemical force, which chemical force may be reconverted into the mechanical. This shows the whole physical forces of our world to be correlated and capable of being exchanged for one another, the sum of energy remaining the same.

It may not be easy to show the full relation between these three doctrines, which I hold to be severally established. But there is no inconsistency between them. Perhaps the full doctrine may be so stated as to embrace all the three and make them aspects of one grand truth. Our world may, as the Pythagoreans supposed, be like a closed globe with an incalculably large but definite number of bodies in it. These act and react upon each other, producing all the activity, all the movement in our world. The bodies act on each other, and form a cause. In doing so they modify each other and the result is the effect. Meanwhile the sum of matter and the sum of energy in the bodies continue one and the same, and both are incapable of increase or diminution. This is at least an intelligible doctrine, and embraces the three truths which have been separately stated, and seems in perfect consistency with all that has been established in regard both to the persistence of matter and the persistence of energy.

I am prepared to stand by and defend the statement now made. But when I inquire more particularly into the nature of things involved in causation, I feel that I am treading darkly and have to guard my steps. Important questions are pressed upon me, and I have to speak without dogmatism.

What is the relation of energy to causation? Energy is now the favorite phrase employed to express the activity of matter. Energy produces changes. But the change must be in something. Physical energy is in the system of bodies. By it one body acts on another. There must be energy of some sort in every system of bodies at all times. But the body acts only when another body is present. When two or more bodies act on each other we have cause. Cause is that which will ever produce the same effects.

Energy and cause must be realities quite as much as matter is. Indeed, energy and causation seem to be in the very nature of matter. Energy is the power that acts in matter. Matter, when it acts, acts causally. The energy in the two or more bodies acting as the cause is the power in causation.

Energy is said to be potential and actual or kinetic. When energy is merely potential the bodies are not in evident action of any kind. The energy becomes real or actual when a body comes into a relation of mutual action with another body. There is now causation.

Some would get rid of energy in physics by affirming that the whole phenomenon consists in motion. But there is energy, potential energy, when there is no seen motion. There is energy in that fragment of marble on my table, and this when the body is not moving. Energy is that which produces motion. The energy is measured by the work it does, that is, by the motion it produces.

The ball A, as it moves by its energy, strikes the ball B, loses its energy, and rests. What is the difference between A moving and A at rest? The answer is that it has an energy in the former case, which it has not in the latter. It will not regain its energy and be able to move till it gets it from some other body.

It has to be added that the body without the energy has the capacity (*δύναμις*) of receiving it.[1] "Energy," says Clerk Maxwell, "cannot exist except in connection with matter" (Matter and Motion, p. 165). We have a like statement by the authors of "The Unseen Universe" (p. 106). "Energy is never found separate from matter, so that we might define matter as the seat or vehicle of energy—that which is essential to the existence of the known forms of energy, without which, therefore, there could be no transformation of energy and therefore no *life* such as we now know it." It is commonly said that the energy is in the body. Sometimes the body has more and sometimes less of this energy. The stone taken to the top of a tower has energy which it loses when it falls to the foot. The spring has more energy because of energy expended in bending it. But the body has the capacity all the while to receive energy. Amid all changes the body continues with its capacity.

Let us now look at bodies acting according to the principles laid down. Without attempting to explain their

[1] Physicists have taken their phraseology from Aristotle, but have changed it. I am not sure whether it would not have been better had they adhered to it more closely. He has a *δύναμις*, a capacity, and an *ενέργεια*, or a power in actual exercise. This is very much the modern distinction between potential and actual energy. Between these two he had *εντελέχεια*, or readiness for action, a phrase which his commentators have had a difficulty in comprehending. It might have an appropriate meaning if applied to the two bodies brought into such a relation that they are ready to act.

exact nature or to enumerate them, let us designate the physical agencies operating in our world by the letters of the alphabet, and view them acting. A ball at rest is struck by a ball in motion. Let us call the ball at rest A and the ball in motion B. The two constitute the cause which is,

The cause AB.

As they act the effect follows: A moves while B's motion is stayed, and as the effect we have bodies changed,

The effect A^1B^1.

But in its motion A strikes C, and B is struck by D, and we have

Two Causes A^1C and B^1D,

and the

Double effect A^2C^1 and B^2D^1.

But these agents come to act on other agents, E, F, G, H, and we have a

Complex result, A^3E, C^2F, B^3G, D^2H.

On the supposition that these agencies are in a closed ball and act on each other and on nothing else, the sum of energy would be one and the same, while each body might be gaining or losing energy, one or both.

In the first action of A B, A gains energy from B and moves, while B loses what energy it gives and is stayed. But A going through the air and over a surface loses the energy it gained, imparting it to the air and surface, and comes to rest; and B is struck by D and gets the energy it has lost and moves. There is thus a continual action kept up among the bodies. The energy in each body varies, it may be from moment to moment, but the amount among all the bodies continues the same. Certain important consequences follow.

1. We see that the effects come to act as causes. Thus if we represent the cause as A B and the effect as A^1 B^1,

we see that each of the agencies A^1 and B^1 is ready to act always when combined with some other agency, such as C and D. These last acting as causes become effects which may again become causes in combination with other or the same things. The conservation of energy thus keeps the world the same through ages, while these constant changes give it its activity; the one as it were constituting an unchanging ocean, the other the tides that agitate it. It is thus, as the Eleatics held, that everything is fixed and immutable, but equally true, as Heraclitus and the φιλόσοφοι ῥέοντες taught, that everything is becoming.

2. We see what is the inertia of body. Newton's First Law of Motion follows from the principles we have laid down. A body at rest will continue at rest forever unless it is acted on by some other body; a body in motion will continue in motion in the same straight line unless stayed or deflected by some other body. All this is a corollary from the principle that causal action is the action of two or more bodies, and that a body will not act unless acted on by some other body.

3. We see the nature of the law of action and reaction. A body will not act unless there is some other body acting on it. Under this view matter is passive. It acts only so far as it is acted on. In another sense it is active. One body acts on another body; thus two bodies are A and B, and A and B are both changed. A at rest moves and B is stayed. What B loses in being stayed A gains and moves. This gives us Newton's Third Law of Motion, that Action is always equal to and the opposite of Reaction. B gives what it loses to A, but the sum of energy of the two is the same after action as before action. It follows that the energy given to A is equal to that lost by B.

4. It has been disputed whether the cause and its effect are contemporaneous or successive. The difference of

opinion springs from confused notions as to the nature of causation. In all causes there are at least two bodies and mutual action, both action and reaction, and these take place at the same time. When one ball strikes another, when oxygen combines with hydrogen, the action on the part of both bodies is simultaneous. But in causation proper the effect comes after the cause; it is the production of the cause. The gain of energy by the one ball and the loss of it by the other is the consequence of the simultaneous action. The water is the product of the chemical union of the two elements.

5. It is sometimes stated that the same effect may be produced by different causes. This is not true, or it is true, according as we understand it. A jar may be broken by a picture falling on it, but it may also be broken by a stone flung at it. The breaking of the jar may thus be produced by two different processes. But in both cases the breaking of the jar is only part of the effect. The full effect in the one case was the jar broken and the picture stayed; in the other, the jar broken with the stone stayed.

6. It is often said that great effects follow from small causes. A cow kicks a kerosene-lamp, and first the shed is ignited and then the half of a great city is burned. The British Government denies Colonial America a comparatively small claim; and a revolution breaks forth which separates Great Britain and the United States forever. But it is not quite correct, it is not the full truth, to say that one cause did all this. In all such cases there is a co-operation and succession of various causes. The fire is carried on by there being all around inflammable materials to propagate it, and the separation of the countries was really produced by a widespread discontent. In like manner a mighty agency may often issue in a very insignificant effect, because there are no conspiring powers. Three

very important philosophical doctrines seem to be thus established.

7. In physical nature (and I speak at present of no other) the effect consists of the bodies which have combined to form the cause being put in a new state. When the cause is A B, the effect is A^1 B^1. The cause may be more complex, A, B, C, D, E, F, and all the bodies are modified and appear in this modified form in the effect, A^1 B^1 C^1 D^1 E^1 F^1. Thus all action is a kind of evolution or development, a favorite doctrine of the theosophists of the East, who draw all mundane things out of other mundane things, and in the last resort all things from God. This doctrine is commonly apprehended in a mystical way which favors pantheism, but it contains important truth, which can and should be separated from the error with which it has been associated. It is not that the effect emanates or grows out from the cause, but it is that the effect consists in the bodies constituting the cause being put in a new state or form.

8. It is wrong to represent, with Hume, the relation of cause and effect as being mainly or essentially that of invariable antecedence and consequence. Most people have felt this doctrine to be meagre and unsatisfactory, without being able to correct it by supplying the felt deficiency. It is not the invariable sequence which constitutes causation; there must be something in causation which produces the invariable succession, otherwise, why should the sequence be so invariable? The certainty in the succession is produced by the power acting in the causes. Causation is thus seen to be in the very nature of the bodies acting as the causes.

9. We see and can explain what is meant by the continuity of nature which was noticed by observers from an early date, and which has been speculated on by many profound thinkers such as Leibnitz. When we look care-

fully into the operation of the material world we discover that there is no break in its successive actings. True, there is often no causal connection between one state of things and another going immediately before, between, for example, night and day, which do not produce each other while they are invariable antecedents and consequents. But when we go behind the more obvious appearances, we find that each is produced by antecedent causes; the day by the shining of the sun and the night by his withdrawal. If we trace any occurrence backward we find it preceded by a series of antecedents, and if we go on with it we have connected consequents. Causation is a bundle of twisted chains each of which follows its own course, but which are all joined in a connected machine. This it is which at the bottom produces the continuity of nature, which, however, is always gathering adjuncts to enable it to proceed.

10. Among these scattering forces there is need of a regulating power to produce order and beneficence. Without this the powers might work irregularly and injuriously, and bring forth only evil agents, such as flaming meteors and burning worlds, pestiferous creatures devouring one another, as gnats, serpents, wild beasts, arresting all forms of beauty and means of happiness, and yet incapable of annihilation. We find instead millions of agencies combining to accomplish good and benign ends. Take the ear. A sister utters a word, a vibration is started, it reaches our ear, is collected by the outer surface and knocks on the tympanum, is propagated into the middle ear, whence it sets in motion the hammer, the anvil, and the stirrup, thence it penetrates into the inner ear, where it vibrates through a liquid, affects the thousand and more organs of corti, is sent round the semicircular canals into the cochlea, and along the auditory nerve into the brain; the silence is broken, and we are cheered by a voice of love.

SECTION II.

PSYCHICAL CAUSATION.

I HAVE spoken of causation in physical nature. I am now to speak of it in psychical action.

The conservation of energy may be regarded as an established doctrine. Savans do indeed continue to assert that some of the most eminent among themselves do not understand it, or have not expressed it properly, or have illegitimately applied it. But it is universally admitted that the doctrine is a true and all-important one.

But let us properly understand and explain it, and keep it within its proper limits. It will be admitted by all at once that we are not entitled to affirm that the law extends beyond our cosmos or knowable universe. For anything we know there may be other worlds beyond ours, and we have no right to say that in these worlds there is only a definite amount of energy which cannot be increased or diminished. God may, or may not, be creating suns or earths or living beings beyond our ken, and altogether beyond our science. The doctrine of the conservation of energy, as I understand, holds only on the supposition that our cosmos is like a closed globe. It is conceivable that our world may not be so closed in; that the dissipated heat which is passing into space may travel into other worlds and influence them without our being able to notice it.

This restriction of the doctrine is so obvious that it is scarcely worth noticing it. But there are other limitations which it is of vast moment to bring into prominence, as they are being overlooked by some of our scientific men. There is clear evidence that there are other potences or

powers in nature besides the mechanical or physical forces. It is not proven that the doctrine of the conservation of energy applies to these.

Take Life. So far as I understand him, Herbert Spencer seems inclined to hold that the doctrine applies to all the powers in the world, even to the vital and mental; indeed, he seems incapable of distinguishing between nerve force and mental force. But he brings no proof that physical force and psychical force can be transmuted into each other. The language of most of our scientific speculators is hesitating. Huxley and Tyndall resolutely maintain that there is no proof that living beings can proceed from non-living. Darwin calls in three or four live germs, which he ascribes to God, before he can account for the development of vegetable and animal life. I have observed that those who reject a separate life or vital force are obliged to bring it in under another form. Thus Darwin calls in a pangenesis pervading organic nature, and Spencer has physiological units which play an important part in generation and heredity, and these are certainly vital forces. Then the arguments and experiments of Beale have to be met, and they have not yet been met by those who would deny the existence of a vital potency of some kind different from mechanical force.

But there are other agents in our world more clearly distinguished from the physical forces than the vital powers are. I refer to the psychical or mental; to those of which we are conscious, which in fact we know immediately; such as our sense perceptions, our memories, our judgments, our reasonings, our desires, our emotions, our resolves. These we know as directly and clearly as we know the affections of body, such as extension and resistance, and we have quite as good evidence of the existence of the one as of the other. Are these mental powers to be

included in the physical forces which can neither be increased nor diminished? Can the physical forces be transmuted into the mental, say the mechanical, or the chemical into thoughts, inclinations, and volitions? Nearly every scientific man in the present day admits, nay, maintains, that there is no proof of this. Many affirm that they cannot even conceive it to be so. Tyndall, no doubt, in his Belfast address hastened on to a high vaporous generalization, and declared that it looked as if all things could be brought under the potency of matter; in the mean time declaring, however, that he could not conceive how matter could affect mind, or mind matter. Mr. Fiske talks of our now needing to assume only one universal assumption, "the principle of continuity, the uniformity of nature, the persistence of force, or the law of causation;" but then he is obliged to add that "in no scientific sense is thought the product of molecular movement, and that the progress of modern discovery (correlation), so far from bridging over the chasm between mind and matter, tends rather to exhibit the distinction between them as absolute." The contradiction is here evident, and has been pointed out by scientific men; but I need not dwell upon it, my object being simply to show that thoughts and mental affections have not yet been reduced to physical forces. No doubt mind and body do so far affect each other. If a person is told that his dearest friend has died suddenly, his pulse will be apt to rise. Prof. Barker attaches a great importance to an experiment of a person first reading easy English, when his pulse was not affected, then reading Greek, when it rose several degrees. Such cases, and they might be multiplied indefinitely, show that mental thoughts and feelings do affect the brain-action, but they do not show that they add to or diminish the physical forces in the brain, or that the mental feeling or thought

has been transmuted into a movement of the pulse. A man standing by a stream pushes a big stone in the water aside and the stream flows a little more rapidly for a minute or two; but he has not thereby added to the quantity of water. Just as little does mental action, reasoning or feeling, add to or diminish the amount of physical force in the cerebro-spinal mass.

There is no evidence, but the very opposite, that our mental actions are identical or correlative with bodily motions or activities of any kind. Take as example, the discoveries of science, the reasonings of mathematicians, the visions of poets, the penetration of such philosophers as Aristotle, the ardor of the patriot, the beatific vision of the Christian, the sacrifices made by the poor for honor and honesty's sake. What savant will estimate for us in quantitative expressions of physics or chemistry, the depth of affection in the mother's bosom when she incurs death herself to save her son, or the height of genius reached by Shakespeare when he conceived Hamlet or Lady Macbeth? There is no one proper quality of matter, such as the occupation of space, or resistance, or elasticity, that can be predicated of thoughts or affections. There is no one quality of mind, such as perception, thought, reasoning, or love, that can be applied to this table or that chair. The instrument has not yet been invented that can weigh or measure our intellectual or voluntary operations. When a tree dies it carries into the ground not only the particles of matter which composed it, but the forces in the tree to add to the forces in the ground. It is the same with the body of brute or of man when it is buried, it carries with it into the grave all the physical forces; but were there any new physical forces added to the earth when Plato, Milton, Bacon, or Newton died?

It thus appears that in the very midst of the physical

forces and their correlations there may be other operations, mental or spiritual, and against this science has and can have nothing to say. I mean to refer to these farther on in the paper.

It is generally believed and acknowledged that there is cause and effect in mind as well as in body. In the one as in the other, we expect the same antecedents to be followed by the same consequents. When we wish to secure in ourselves or others, say in the young, a certain disposition or habit of patience and perseverance, we set agoing a training or discipline fitted to produce the result. When we are anxious to gain the good will of our neighbors, we address the motives most likely to sway them. The orator seeks to convince and move to action by arguments and considerations likely to influence his audience. In knowing a man's propensities, we can at times predict the part he will take in certain circumstances, and so far as we cannot do this fully, or accurately, it is simply because we are not fully acquainted with all the elements in his character; just as in physical nature we often cannot foresee the events that are to occur, because the powers operating are so numerous and complicated. There are some men of whom we are sure that they will not do a mean act. In many cases we can determine what a man's springs of action are by his acts; we are sure he is swayed by passion or malignity, by honor or by charity.

It is clear that there is Power in the mind—I use the word power, leaving the phrase energy to be applied by the physicists to the action of body. All writers who have had occasion to refer to the operations of the mind, have spoken of its powers or faculties, classifying them in various ways, as into the Gnoetic or Gnostic and the Orective with Aristotle, translated into Latin the Cognitive or Motive, or the Understanding and the Will, the Intellect

and the Feelings; and they have spoken severally of the Senses, the Memory, the Imagination, the Reason, the Conscience, the Emotions, and Volitions. They have regarded all of these as having an influence, and capable of producing an effect.

It is not easy to determine precisely the nature of mental effectuation. We are not able to measure psychical as we do physical energy, in foot pounds. It might indeed be argued that, as being immediately conscious of it, we do, in fact, know as much in a general way of mental as we do of bodily production; but we are not able to put it in quantitative form.

This power manifests itself in two ways. There is the power of the Mind over the Body, with the corresponding capacity of the Body to produce an impression on the Mind. For upwards of 2,000 years, philosophers held, generally, by the principle of Empedocles, the Sicilian philosopher, that like can only influence like, and they denied that mind could influence body, or body mind, and this opinion still lingers among metaphysicians. I deny the principle that like can only sway like, and I can see no difficulty in allowing that psychical action may produce physical action, say action of the nerves, and *vice versâ*. It certainly seems to do so. I will to move my arm, and there is action in the gray cellular matter of the periphery of the brain, which proceeds down the transmissive white matter to a basal nerve which moves the muscles and the bones, and the intended effect is produced. There seems to be a causal action throughout this process: an action of the mind on the brain, and of the brain on the nerves. There is a like phenomenon in the feelings producing an effect on the organism, as when a ludicrous idea leads to laughter, and grief bursts out in tears, and a sense of kindness received covers the face with smiles.

Even intellectual exercises seem to have an effect on the brain, as exhaustion is felt when they are prolonged.

There is also an influence of the body on the mind, as when the bodily senses produce a mental perception, say of a form or a color, and a healthy organism raises up pleasant feelings, or a diseased stomach or liver raises up gloomy thoughts. In all these cases there is a power producing certain defined effects. It may be argued that the effects follow not directly, but by some agency commonly supposed to be unknown. There is a constant inquiry into the *how* in the relation between mind and body, usually followed by the acknowledgment that it is a mystery. At this point it may at once be allowed that in the mutual action of mind and body there are processes unknown to us. No one will maintain that the physiologist can as yet specify all the steps involved in the process by which an external object reaches the perceiving mind. But suppose he is able to do so, it does not appear to me that the mystery would thereby be diminished. In tracing back the nervous and the cerebral action, we come at last to a point or line where the body acts on the mind. The only way of avoiding this conclusion is by calling in some sort of *tertium quid* in the shape say of a plastic medium, which communicates between mind and body. The difficulty is not thereby removed, it is not even lessened; for, if it is of the nature of either body or mind, we have still to show how it acts on mind if it is body, and how it acts on body if it is mind. If it is of the nature, neither of body nor mind, it is an unwarranted hypothesis, explaining nothing, and multiplying the difficulties, for we have now to explain how in one case body acts on the medium, and the medium on mind, and how in the other case mind acts on the medium and the medium on body. The simplest, and on the whole the most reasonable supposition, is that mind has a potency

whereby it acts on body, and body a potency whereby it acts on mind. This is far more likely than the Malebranche's hypothesis of occasional cause, or that of pre-established harmony by Leibnitz. Sooner or later, we may be able to determine precisely the nature of the action, that is, in what circumstances it acts, how far it extends, and how it is limited. This is all we can know about any law of nature, and when this is accomplished there is no more mystery than in the law of the mutual attraction of matter, or in that of chemical affinity.

But very nice questions are here started, and to these we can give little more than negative answers, fitted to remove erroneous impressions. Is there any such relation in the mutual action of psychical and physical action as is implied in the conservation of material energy? When the body acts on mind, does the energy in matter go into mind, and appear in a new form? Or when mind acts on body, is there new energy entering matter? I answer unhesitatingly that there is no proof of this whatever. On the contrary, every thing goes on in the body according to the laws or properties of body, and every thing in the mind according to the nature of mind. Our volitions and other mental acts may give a new direction to the forces in the bodies, but they do not add to them or increase them. Our will moves the arm which was before at rest, but it only calls into activity the potential energy already there, and that energy acts according to its nature. The senses make known an object to us, but it does not add any new mental power, and the object being there, or rather being known there, calls forth ideas or feelings according to the mental laws of association. In the body every thing proceeds according to physiological laws; and in the mind according to psychical laws.

In all such causation there is at least a duality in the

cause, both a physiological and a psychical: these together constitute the cause without which the effect would not follow. There is a like duplicity in the effects, both body and mind are changed.

Secondly, there is causation operating in the mind itself. By the will and other psychical acts we can influence not only the body, but the state of the mind. We can detain the present idea, and bring up thereby a succession of associations pleasant or unpleasant: profitable, as when we contemplate a high exemplar, or cherish a good resolution; or noxious, as we cherish revenge or lust. There are certain states of mind which follow necessarily from certain others. The idea of a friend in distress raises grief, of an acceptable gift raises gladness.

I am not sure that we can express accurately the nature of psychical causation, yet we can say much about it. We know so far the limits of the several faculties. We know much of the power of sense perception, as that it reveals objects external to us; that we do not know distance directly by the eye, that we cannot have any idea of a color or odor that has not been made known by a special inlet,—the man born blind has no conception of color. We have ascertained as to memory, that it remembers whatever was vivid in the original impression. The imagination can bring up in new forms and dispositions only what we have previously experienced. We can reason only when we use a middle term to combine the two terms whose relation we do not know. Emotion springs up only when we have an apprehension of something good or evil. Conscience approves of certain acts, and condemns others. We cannot express these powers quantitatively, as we do those of gravity and chemical affinity. We cannot number or measure them as we do the physical forces. Still we can notice their extent and their boundaries. Psychology is doing its proper work

when, with consciousness as its agent of observation, it is finding out the powers of the mind and their functions.

In inquiring more specifically into the nature of psychical causation we find that, while in one sense it is simple, in another sense it is complex. We have seen that there is a duality or plurality in all physical production, both in the cause and in the effect. We have seen that there is duality or plurality in the action of mind on body and body on mind. There is a like complexity or plurality in purely psychical action, both in the cause and in the effect. What is the cause of this reproach of conscience which we feel after committing an evil deed? An essential part of it is no doubt the immediately state, the idea of the deed. But this is not all. Acting with this there is a native moral power, a power of conscience. It is only when there is joint action that the deed is condemned. The mere image or conception of the deed will not call forth the reproach; nor, on the other hand, will the moral power act unless there be an apprehension of the deed: the effect is produced by the union of the two. So it is in all cases. When the mother grieves over the death of her son, there is more than the conception of the event; there is the deep affection which she cherished towards him.

We have seen, that in physical causation, there is always something abiding. Aristotle had a material, as well as an efficient cause. It is the same *mutatis mutandis* in psychical action. In all material action there is a body as a substance, and in all mental action there is mind as a substance; both being permanent. This is a truth never seen or acknowledged by Mr. John S. Mill, who defined mind as "a series of feelings aware of itself," whereas it is an abiding existence with a series of feelings. He defined body as "a permanent possibility of sensations," whereas it is a permanent thing, ever ready to produce sensations within our minds. The present state of the

soul is always the necessary effect of the immediately preceding one. But in that preceding state, and I may add in the present one, there is the mind itself with its capacities abiding. The cause of every given thought and feeling is thus a complex one, made up of some previous thought or feeling, but also of the mind thinking and feeling.

The portrait suggests the original. Is the portrait, or the perception of it, the cause of the thought of the person painted? I do not regard this as a full account of the cause. The portrait may be seen by one who never saw the original, and to him there is no such suggestion. The true cause embraces the sight of the portrait, but there is also involved in it the mind with its knowledge of the person painted, and also the principle that like suggests like. When two premises are before the mind, they necessitate a conclusion, as when we have it allowed that "all men have a conscience," and that "the Indian is a man," we conclude that "he has a conscience." Are the two premises the cause of the conclusion? I believe they are not to be so regarded. The act taken by itself is to be regarded as one of judgment, and not causation. In the cause there are not only the premises, but the laws of the mind, or rather the mind with its laws, that is, the laws of reasoning, especially the dictum of Aristotle, that whatever is true of a class is true of all the members of the class. Every thought, every feeling, I may add every resolution, is thus the result of the state of the mind with its properties, and of the immediately preceding thought or feeling, which might be called the occasion. It thus appears that the web of causation is quite as complicated in psychical as in physical nature.

I am unwilling, in this paper, to enter into the conflict of ages as to whether there is causation in acts of the will. I am prepared to argue that there is. On the other hand, I hold resolutely that there is a sense in which the

will is free. Holding by both these truths, as I reckon them, I am obliged to add that I cannot remove all the difficulties in which I am thus involved. It is asked, how can there be free will, which I resolutely hold, if our volitions are after determined by something out of themselves, and above themselves? I do not profess to be able thoroughly to clear up this subject; but the view of causation which has been set forth in this treatise is fitted, I reckon, to lessen, if not to remove, some of the difficulties. We have seen that there may be different kinds of causation. The causes that act on the will are certainly not mechanical or physical, like those which compel a body to move in a particular way. A man's volitions are not swayed altogether, or even mainly, by the same circumstances; for two men will act differently in like circumstances, and this evidently owing to the difference of their character. We have seen that there are causes operating within the mind itself. Those that finally sway and determine the will lie within. If we properly understand the language, I believe we may admit that in every particular act the mind is swayed by motives, but the motives are to be found, not out of the mind, but in the mind, nay, largely in the will itself. The causes which sway the will are mainly in our nature and character, in our dispositions and habits which our own wills have been forming. It is certain that this man will yield to the temptation, and be guilty of excessive drinking in a particular company, but it is because of habits which he has indulged in for years. It is certain that this other man will act honorably in a certain trying position, but then it is because he is guided by right principles, and by an upright character. I do not say that this doctrine delivers us from all difficulties, but it helps to relieve us from the oppression which we feel when we are told that our whole acts are under a law of stern necessity which allows no liberty.

SECTION III.

CAUSATION SUBJECTIVE.

The above is all I am able to say as to the nature of cause. I do not claim to have removed all difficulties. I am satisfied if I have corrected some erroneous notions and shed some light on important points. I am now to turn to the other side of my subject, to the mental process involved in our conviction as to the relation between cause and effect. Even as causation objective pervades all nature, so causation subjective runs as a binding power through the great body of our mental exercises.

We may allow physicists to use the word energy for the activities of matter. But there is activity in mind as well as matter and it is needful to have a word to express both. The word Power may be used for this purpose.

There are two special ways in which we come to know power. The one is by the muscular sense. We move a muscle, and we find it resisted by the objects it meets with. We experience this in the first exercise of our muscular activity and in every succeeding one. There is resistance offered not only by that table, but by the air as the arm passes through it. Science finds it necessary to maintain that the very ether has been offering resistance to the passage through it of the comet of Encke. The other is by the exercise of our voluntary power. Our volitions produce changes directly or indirectly over our bodies of which we are sensible. We will to move the arm, and it moves. Our will also produces changes on the states of our mind.

We will to detain a present thought, and it keeps with us as long as we will, thereby resisting the ordinary flow of association.

I believe that both these potencies have a wider extension than is commonly supposed. I have at times thought that there may be power discerned, as it is certainly involved, in the exercise of all the senses. In the vibrations which enter the ear, in the rays of light that fall upon the eye, in the odors that reach the nostrils, in the liquid which affect the palate, there is a mutual action dully felt of the touching bodies and of the organism. It might be argued, I think, that in all these ways we get an apprehension of bodies as having power, just as it is now generally acknowledged we have a knowledge by all the senses of bodies as having extension. We know our nostrils and palate as having a certain direction which must be in space, so we seem to know these same nostrils as affected, which implies power.

I am farther sure that volitions are constantly mingling with our mental operations. A sensation is agreeable and we detain it, or it is disagreeable and we banish it or escape from it, and in all such processes we use causation. There is an exercise of will implied in the regulation of our thoughts, otherwise they would run wild as in our dreams. In making ourselves acquainted with any subject we have to attend to it, and attention is an act of the will. In reading a book and in listening to a discourse we have to keep our thoughts from wandering, which they would be sure to do if they were allowed to follow merely the laws of involuntary association. We have to order our thoughts when we are conversing with our fellow men, and when we are writing intelligently. The orator has to give his thoughts a direction all toward a point, when he is seeking to arouse and persuade. The mathematician, and indeed,

every one who reasons closely, has to restrain and guide his ideas and his judgments. Some have supposed that one difference between our waking thoughts and our dreams lies in the will having lost its control in the latter, mainly owing, it may be, to the weariness of the organism, indisposing us to farther exertion till the pool which had run out is again filled. Causation has thus a place in the greater number of our thinking operations. We exercise power in every volition, but volition is constantly interposing to direct our thoughts.

Causation has a place in the very steps by which we obtain our knowledge of things. It is involved in the very means by which we acquire our knowledge of external objects. We know them as affecting us, that is, having power over us. It is much the same with all the knowledge acquired by us. The things have been made known by their having power over us, or some other thing, by which they are made known to us.[1] It is a common saying that we know things by their properties, but what are properties but powers? It is not by induction, that is, a gathered experience, that we know things as having power; we know this in our primary experience, and in all subsequent experiences. Power is thus involved in things as known to us. We cannot think of them except as having powers.

It will now be seen how I would settle the question which has been the leading philosophic one since the days of David Hume, as to whether our conviction as to cause and effect is *a priori* or *a posteriori*, to use the phraseology of Kant, or, to employ more unexceptionable terms, arises at once from our looking at things, or is the reasoned result of a gathered observation. It is certainly experiential, as all

[1] "We are obliged," says Herbert Spencer in his First Principles, "to regard every phenomenon as a manifestation of some Power by which we are acted upon." Let him follow out this.

our knowledges and beliefs are in the consciousness of the mind, but it is not experiential in the sense of needing induction and reasoning. It is intuitive in that we perceive it to be in the very nature of the thing. It can stand the tests of intuition, as these have been enunciated in the paper on the *Criteria of Truth*. We perceive objects directly as having power and acting causally. It comes in consequence to be necessary; we cannot believe it to be otherwise. We cannot be made to believe that there is an event without a cause, or a causal relation without a definite action being ready to follow. It is, thirdly, universal in that all men have the conviction.

Not that this is done without the competent and appropriate mental capacity, but this is neither less nor more than the faculty to perceive the thing, and what is in the thing. These perceptions may take several forms, such as primitive cognitions, faiths, and judgments: cognitions when we look directly on things, faiths when they are absent and yet we believe in them, and judgments when we compare the things known and believed in. Our perception of self and body having power is of the nature of a primitive cognition. Our conviction as to cause is more of the relation of a judgment in which we discover a relation. Except that I am not partial to the formidable nomenclature, I am willing to allow it to be called, with Kant, a synthetic judgment *à priori*. But the two, cause and effect, are connected, not by a category or a form of any kind in the mind, as Kant held, but in the very nature of the things, in the action of things according to their nature, that is, the properties or powers by which they are endowed.

SECTION IV.

VARIOUS SORTS OF CAUSES.

From the nature of causation, as I have endeavored to unfold it, there is a vast complexity in the activities of our world. There are two, or commonly more, agents in every cause, two or more in every effect. What a variety of powers at work in the great natural occurrences, say in the seasons, in the production of spring with its increased heat, its buds and blossoms and leaves. What a complication in the production of the great epochs of history: in the spread of Christianity, in the revival of learning in the fifteenth century, in the great Reformation of religion, in the English, the American, and French revolutions. There are innumerable agencies concurring and crossing in all the important events of our personal and family life.

In this complexity a number of very marked operations, well worthy of consideration, come under our view. One of these is Development or Evolution. All physical causation is in a sense evolution; it is a body, or rather a combination of bodies in one state produced by a body or bodies in another state. The development as such may or may not be beneficent. It is conceivable that it might move on ruthlessly, working only confusion and misery to sentient beings. When it proceeds in an orderly manner, with beneficent laws, and means of promoting the comfort of animate beings, there is evidence of good arrangement. The subject of Development is so important as to require

a separate paper, when it will be shown that it is an organized causation.

It will be necessary here to take up a subject on which I fear little light can be thrown at present. It is the nature of energy and causation in chemical action. Oxygen and hydrogen combine to form water; what is the relation of the two elements? Is it simply mechanical? Or does it imply the existence and operation of a separate power which we may provisionally call the chemical? To these questions no very satisfactory reply can be given at present. There are some presumptions in favor of its being shown in the end that the union is merely mechanical. On the other hand, there are phenomena which cannot be thus explained at the stage which science has now reached. The most remarkable peculiarity of this chemical combination is that the compound exhibits properties of which no trace can be found in the separate elements. Water shows qualities which neither oxygen nor hydrogen seem to possess. In consequence many questions arise which cannot at this present time be definitely and certainly answered. Were the powers now shown by the compound in the elements in a potential, but not in a real state? Have we in the union merely an example or the duality or plurality in all causation, the elements taking a new form or shape in the compound? It is certain the bodies constituting the elements have not lost their identity. The water can be decomposed, by some other body acting on it, into the oxygen and hydrogen of which it is composed.

The above are questions which we may expect to have settled sooner or later, as we come to know more of the constitution of matter.

In the complexity of causal action we may notice the combination of a number of agencies necessary in order to the production of results which have an important place

in the economy of nature. These, in a loose sense, may be called causes. From the very commencement of reflective inquiry men had to refer to causes. But for ages the views taken and the nomenclature used were vague and confused, though containing important elements of truth which have been unfortunately omitted in the more precise systems of modern times. In the theosophies of the East causation was represented as an emanation of one thing out of another, and of all things out of God. The tendency in this conception was toward pantheism. The Pythagoreans made numbers the cause of things, meaning that which makes things what they are. Aristotle blames Plato for neglecting efficient and final causes and giving exclusive attention to the matter out of which things are formed, and the form they are made to take.

Aristotle was the first to draw distinction between the different kinds of cause. This he did in his Physics, ii. 3, and recapitulated in his Metaphysics, i. 3, with a farther reference in Post Anal., ii. 11. In these passages he uses the word (cause) in a wider, and it may be allowed in a looser, sense than we now do. The grand object of the First Philosophy is to discover causes. By cause he meant all that is necessary to account for or explain a thing, all that is necessary in order to its *being as it is*, and therefore to our comprehending it and explaining it. In later times the word cause is commonly restricted to efficient cause, to productive cause, or as Hume analyzed it, invariable antecedent. Aristotle included this, but also included other things *necessary*, as he thought, *to make a thing what it is*; which is his definition of cause. He had four kinds of causes. He had first a matter and a subject (*τὴν ὕλην και τὸ ὑποκείμενον*). He had secondly a cause, whence the beginning of motion (*ὅθεν ἡ ἀρχη τῆς κίνησεως*). Thirdly, he had a cause which was the substance—that in

which a thing consisted (*τὴν οὐσίαν καὶ τό τι ἦν εἶναι*). Fourthly, he had that on account of which a thing is (*τὸ οὗ ἕνεκα*). More briefly, he had a *ὑλή*, an *ἀρχὴ κινήσεως*, an *εἶδος*, and a *τέλος*, which we translate a material, an efficient, a formal, and a final cause. He sought in every object for each of these. He did not regard the one as inconsistent with the other. He often found several of them in one and the same object (De Anim., ii. 8). In regard to the material cause, he represents the Ionians as seeking for it and finding it in water, air, or fire. As to the efficient cause, he regarded it as that which produces motion or change. The formal cause corresponded to the Idea of Plato, only he represents it as being not above things, but in things. He does not use final cause to prove the divine existence; he supposes the thing to have in itself (as immanent) an end after which it is striving—a view very much the same as that taken by Hegel. He blames Plato for neglecting the efficient and the final, and confining his attention to the material and the formal.

These distinctions were not drawn by the thinkers who preceded Aristotle. Socrates, without giving final cause a separate place, used the argument from final cause—the argument from intention or design, as seen for instance in the eyelids to protect the eyes. Plato argued more from the models or patterns in nature. Epicurus simply ignored final causes. The Stoics identified efficient and final, representing every thing as done in conformity with the decree (fatum) of God; and so ordered that one thing is a prognostic of another thing. Cicero (De Nat. Deor. 115) and Augustine (Civ. Dei, xi. 4, 21) appeal, like Plato, to the order of the universe. The schoolmen did not use Aristotle's division of causes so frequently as they did his logical distinctions, but occasionally they proceeded upon it.

Coming to modern times, Bacon adopted Aristotle's four-

fold division of causes. He gives material and formal causes to Physics, and formal and final to Metaphysics, which he regards as occupying a higher sphere than physics. It is often said, by men who have never read Bacon's works and take his opinions at second-hand, that Bacon sets aside final cause. This is an entire mistake. He would exclude it from physics, but it is only to give it a higher place in metaphysics. He compares it to the vestal virgins, not productive indeed, but dedicated to God. He erred, I think, in excluding final cause altogether from physics, where it may be used, if properly restricted, in the study of organisms, where the means are ends and the ends means. While he was living, Harvey discovered the circulation of the blood by the principle of teleology, arguing that the valves which he saw opening in one direction and not in the opposite must be intended to let a fluid pass through—thus discovering the grand doctrine of the circulation of the blood. But Bacon was right in insisting so strongly that the discovery of final cause should not keep men from seeking the efficient cause. Bacon attached great importance to the discovery of forms, which he represented as the supreme end of all science. The form of a thing is that which makes it what it is—thus, anticipating our latest science, he regards motion as the form of heat. Without fully seeing it, he came very near to Plato; the aim of all science, according to both, being to discover ideas, forms, or patterns; only, according to Plato, the ideas are to be discovered by calling forth the inward idea, while according to Bacon they are to be found by a careful induction of facts. Bacon showed profound wisdom in making the discovery of forms the supreme end of all science; and in placing the forms of nature at the very top of the pyramid and next unto God.

Descartes perceived God in every mechanical action, and

could not believe that God was to be seen in one act more than in another; and insists that we ought to beware lest, "in our presumption, we imagine that the ends which God proposed to Himself in the creation of the world are understood by us" (Princip. Philos., iii. 2). There is a misapprehension here of the kind of ends supposed to be discovered by final cause, and it is curious that his error is pointed out by Gassendi, an adherent of the Epicurean philosophy. "You say," he replies to Descartes, "that it does not seem to you that you could investigate and undertake to discover without rashness the ends of God. But although that may be true if you mean to speak of ends that God has willed to be hidden, still it cannot be the case with those which He has, as it were, exposed to the view of the world, and which are discovered without much labor." The celebrated natural philosopher Robert Boyle also answered Descartes. Referring to a gnomonic instrument, "It would no doubt be great presumption on the part of a peasant, ignorant alike of mathematical science and the intentions of the artist, to believe himself capable of discovering all the ends in view of which this machine so curiously wrought has been constructed; but when he remarks that it is furnished with an index with lines and horary numbers—in short, with all that constitutes a sun-dial, and sees successively the shadow of the index mark in succession the hour of the day, there would on his part be as little presumption as error in concluding that this instrument, whatever may be its other uses, is certainly a dial made to show the hours." Leibnitz, with his usual comprehensiveness of mind, would unite final and physical causes. "It is good," he says, "to conciliate those who hope to explain mechanically the formation of the first texture of an animal, and of the entire mechanism of the parts with those who give

an account of the same structure by final causes. Both are good, and the authors who follow these different ways ought not to abuse each other." [1]

From this survey we gather that some of the profoundest thinkers that have appeared in our world have seen more than mechanical cause in the course of nature, and that they have discovered no inconsistency between efficient and final cause. We are now to illustrate these two points.

There is a foundation in nature for Aristotle's fourfold division of explanatory causes, though we may have to amend it somewhat to suit it to modern science.

Material Cause.—Here we inquire into the nature of the substances, be they inanimate body, or living body or mind. It is the end pursued in chemistry, and in all the sciences dependent on it, and so far also in psychology. No doubt the inquiries into the matter, and the forces in matter, may be mixed up with each other; but they may be distinguished, and it is often desirable to separate them.

We may or may not approve of calling the matter out of which a thing is formed a cause, but it certainly has a place, and this a deep one, in the economy of nature, and as such it should be acknowledged. It is allowed that there is never energy without body, and the body should be taken into account as well as the energy, in explaining what things are and how they act.

Efficient Cause.—This is the kind of cause whose nature I have been seeking to determine in the earlier part of this paper. It is the power element in what makes a thing to be what it is. This sort of cause is not inconsistent with the others. It is necessary in order to make the matter take a form and fulfil an end.

[1] The quotations from Gassendi, Boyle, and Leibnitz may be found in M. Janet's work on "Final Cause," translated by W. Affleck, pp. 184, 185, 119.

Formal Cause—the idea of Plato, the εἶδος of Aristotle, the law of modern science, and the type of naturalists. We have here mechanical causes, but co-ordinated so as to produce orderly results, as we see in what are called the laws of nature. The properties of bodies, such as attraction, chemical affinity, etc., may be simple; but they require conditions, that is, co-operating agents, in order to their working. But the general laws of nature are always complex; that is, imply the action of two or more agents operating and co-operating. We see this in the law of the succession of day and night, of the revolution of the seasons, spring, summer, autumn, and winter; in the motion of the planets in their orbits. What a number and variety of agents conspiring in the reproduction of plants and animals; in the seed, the blade, the fruit, the decay of the vegetable; in the germ, the growth, the death of the animal! What a complexity in order to the production of the mathematically exact forms and harmonious colors of the shell, the stalk and the flower of plants, and the bones of animals! What a combination to produce those types according to which we classify the animate kingdoms, and which make every living thing to grow after its kind! What a complex complexity in that assortment of forces which produce development and heredity—processes of which we now talk so glibly and familiarly, but of the elements of which we know so little! All these may be called the ideas or forms of nature.

Much the same may be said of Formal as I have said of Material cause: we may or may not approve of the term cause being applied to it. But it is quite as clear that things are made to take a form as that they have a matter, and are produced out of that matter. It is one end aimed at in all science to discover what the form, or, as it is now more commonly called, the law is. Our view of nature is

narrow and partial if we see only its composition and the mechanical powers acting in it. In that rich web we should notice not only the silk threads and the shuttle carrying them along, but also the pattern after which the whole is formed.

Final Cause.—Here there is a concurrence of mechanical or efficient causes to produce an evident result. It is not an antecedent followed by an effect; it is the consequent or issue of a number of conspiring antecedents. From the number of agents combining to effect an end we argue that there are intentions and purposes. I suppose a hundred agents so far independent must combine before I can see. I infer that there must have been a designed arrangement in order to their coming together to produce the obvious end.

We discover these four causes in the works of man. That statue of Hercules had a material cause in the marble in the quarry; an efficient cause in the chisel of the sculptor; a formal cause in the shape given it; and a final cause in its being set up in a temple. We can discover the same four causes in nature. In shells we have the matter, be it carbonate of lime, or whatever else; the chemical forces operating; the mathematical form taken—possibly a spiral; and an end the protection of the animal. In the plant, say the apple-tree, we have the chemical elements; we have the vital forces, whatever they be; we have the shape taken by the tree and by its flower; and a final cause in the fruit provided for the sustenance of living creatures. In the cereals there is matter in the composition of the plants, an efficient (not necessarily a mechanical) cause in the vital forces, a formal cause in the form taken, and a final cause in the food provided for the nourishment of man and living creatures. Take the two colors, blue-purple and orange-yellow, found in the flower of the forget-me-

not: they must have a composition produced in some way by the dividing of the beam; they are found in all the plants of the species; and they are suited to the eye, which delights to look on complementary colors—that is, the colors that make up the beam.

I believe that these four principles can be discovered in all animated objects. In dead matter it may be more difficult to detect all of them in every individual object. Yet in the higher forms we can discover several of them. Thus in crystals, the crystalline forms, which all bodily substances are capable of assuming, we have the matter, the forces, and also the forms; but it might be difficult to discover a special final cause. Plato, in seeking to find his idea everywhere, was asked whether he could find it in the dust or sand of the ground, and acknowledged that he was in difficulties. Modern science could help him here, and show him by the microscope beautiful forms in the rudest matter. It might be impossible in such cases to detect a final cause; but just as we argue that there is efficient cause everywhere, though we may not be able to discover it in every occurrence, we may, on a like principle, infer that as we discover a purpose in so many parts of nature so there is purpose everywhere, if only we can discover it; and thus reach the conclusion of Socrates, Plato, and Leibnitz, that nature consists of physical causes working for ends.

SECTION V.

FINAL CAUSE.

I AM sure that the course of nature cannot be comprehended or explained except by taking into account more than efficient cause, except indeed by all of the principles we have been considering. The chemist will insist on knowing what is the elemental composition of the crystal, the rose, or the crustacean. The naturalist will seek for the type that he may be able to arrange it. The merchant will wish to know its economical use that he may buy or sell it.

We know not what is the number of elements in the material universe. The ancient Greeks supposed them to be four: air, water, fire, and earth. Modern chemistry has found sixty-four, which it cannot analyze into any thing simpler. Many chemists think that some of these can be resolved into others. It is certain that there is in nature a certain number of elements, be it four or sixty-four, with their properties. We may conclude that these are adapted to each other. Were they not, they would not act upon each other, molecule on molecule, atom on atom, mass on mass, as they evidently do. The orderly results point to an instituted order. Being so adapted, if these elements were cast into a capacious vessel, they would produce regular results such as we see in a kaleidoscope, where we have a number of beads thrown into a constructed receptacle, and reflected by glass, and producing regular figures. Here we have in the figures a material

cause in the instrument, with its wood and glass and beads; an efficient cause in the movements of the beads; and a formal cause in the regular shapes and dispositions. It can scarcely be said that in the figures themselves there is a final cause, for no end is served by them, except indeed to give pleasure to the beholder. But there is certainly a formal cause. And I would have it noticed that this form is a result of arrangements made, and of mutual adaptations, arguing a purpose and design. So it is with the laws, as they are called, and types of nature. They are the result of a vast number of agents or efficient causes combining and co-operating. We thus see that the very order of nature is a manifestation and evidence, as Plato, Cicero, and Augustine argued, of plan and purpose, and therefore of intelligence.

But Final Cause furnishes another and a more special argument. It may be noticed of the figures of the kaleidoscope that they never show final cause, properly so called. They never show amidst their great varieties such utility as a lichen, a polype, a finger or a toe, much less a hand or an ear. Mathematicians tell us how many millions of chances there are against a handful of molecules ever producing an ear, and how many millions of millions against their producing in the same frame an eye, a nose, a tongue, skin, and muscle, and nerve, and brain. How many milliards of milliards of chances against the formation of all the senses and organs of all the creatures on the face of the earth. The meeting of these efficient causes in the frame of man and animal makes it as certain as mathematics can make it of their being an end contemplated and designed.

The force of this argument is not to be avoided by saying that what we represent as final causes are merely conditions of existence. True they are conditions of existence;

but the proofs of design lie in the conditions of existence all meeting in the hundreds or thousands of coincidences all coming together to form the rose, or the deer. The strings of a harp are the conditions of its existence, and we argue that the harp has been made for a purpose, because the strings are all there and yield music.

At this place I think it proper to refer to the *Course of Nature*, an address delivered by Professor Newcomb, as President of the American Association for the Promotion of Science. I do so because there is presented there, by a gentleman whom I profoundly respect, the views entertained by a great many scientific men in the present day. The Professor evidently labors under several very erroneous impressions in regard to final cause. "From the very earliest at which man began to think two modes of explaining the operations of nature have presented themselves to his attention. These modes are sometimes designated as the teleological and mechanical." He thinks that final cause is meant to give the same sort of explanation of a phenomenon as efficient cause. But all enlightened defenders of final cause have asserted that the two principles or causes do not accomplish the same ends. Final causes or ends were never meant to account for the production of an event; this is done by efficient cause. On the other hand, an efficient cause does not show how efficient causes or forces should combine to produce an obviously intended beneficent result—the good, as Aristotle calls the final cause. The fact that the ear was meant to hear did not make the ear, though there are passages in Lamarck which seem to indicate that the wish of the fish to fly actually gave it wings. We bring in efficient cause to explain one thing, namely, production; and final cause to explain another thing, a combination to produce a useful end. Again, he argues that we are entitled to call in final cause only when physi-

cal cause fails, thereby falling into the error of Kant and Laplace, both far-sighted but one-eyed men. But surely he sees both efficient and final cause in the telescope by which he scans the heavens so profitably: efficient cause in the formation of it by Clark, and final cause in the use to which he is able to turn it. Nor will it do to say that he uses the instrument because it is there; it is there because he or some other was meant to employ it. It is conceivable that there should be a like union of the two principles in the eye and in the works of nature generally.

He is evidently under a farther impression that the two are inconsistent. He thus makes them rivals, and supposes that the one strives with and overcomes the other. But final cause, so far from being inconsistent with efficient cause, implies a combination of physical causes, which are blind in themselves, but which are led by a prearranging power to combine to accomplish an end. He insinuates that as mechanical cause comes to be seen everywhere final cause will have to hide itself. But viewed by a mind capable of seeing two truths alongside of each other, the belief in and the evidence of ends in nature are not vanishing, as the Professor expects. We have as clear and certain proof that the eye was meant to see and the ear to hear as the first man had, and can now discover more fully the wonderful machinery by which the ends are effected.

The Professor's argument against final cause is the most glaring example of the fallacy of irrelevant conclusion or of *ignoratio elenchi*, which I have seen for many a day. He would disprove the existence of final cause, and he merely attempts to prove the universal presence of mechanical cause. With proper explanations we may admit all he claims as to mechanism and not feel thereby that teleology is weakened. Let us look at the principles at work when our astronomer gazes at a binary star with his telescope.

Rays go out from the star, proceed in vibrations, first through millions of miles of ether, then through thousands of miles of air; then into the telescope, where they are turned in a variety of ways; then into the eye, into the cornea, which is transparent; into convergent media, which unite the luminous rays, the three refracting media—the aqueous humor, crystalline lens, and vitreous humor—till they fall on the retina, where, according to the theory of Young, carried out by Helmholtz, there are twelve thousand or even twenty thousand cones, sensitive to various kinds of light, and they form there the image of two stars with perhaps complementary colors. The process is not ended till an action goes up through the optic nerve into the brain, and not till then does the astronomer see his star. The want or the failure of any one of these processes, thousands in number, would prevent vision or make it imperfect.[1] In this long and complicated process there has been mechanical cause throughout. Professor Newcomb will not deny that there is final cause, in the part of it which goes on in the telescope; but if there be an end manifested in the passage of the rays through the one instrument, the telescope, there is like, but far stronger evidence of a purpose in the other instrument, the eye.

In all such discussions a distinction of some kind is drawn as to the actual operations of the forces or laws of nature.

[1] M. Janet has shown that Helmholtz has answered his own objection derived from the imperfections in the eye. The great German physicist says: "The appropriateness of the eye to its end exists in the most perfect manner, and is revealed even in the limits given to its defects. *A reasonable man will not take a razor to cleave blocks;* in like manner every useful refinement in the optical use of the eye would have rendered that organ more delicate and slower in its application." This is sufficient to defend final cause. But a full explanation may have to take into account the existence—the great mystery of our world—of disease and pain.

Paley in his "Natural Theology" indicates a distinction between the laws of nature and their construction, and speaks of an adjustment being necessary, and of "the laws being fixed" and "the construction being adapted to them" ("Nat. Theol.," iii.). Dr. Chalmers drew elaborately and illustrated at great length the distinction between the Laws of Matter and the Collocations or Dispositions of Matter. "We can imagine all the present and existing laws of matter to be in full operation, and yet, just for the want of a right local disposition of parts, the universe might be that wild undigested medley of things in which no one trace or character of a designing architect was at all discernible" ("Nat. Theol.," ii. 1). Mr. Mill has adopted this distinction, and sees that "collocations as well as laws are necessary to the operation of nature" ("Log.," iii. 12, 16). I have taken up the subject at this point and endeavored to give the distinction greater precision. I have shown that it is between, not the laws of matter and collocations, but between the properties of matter and adjustments necessary to their operation. I have shown that the laws of matter are not simple, but complex, and imply adjustments; this is the case with the seasons, the typical forms of plants and animals; all imply a number of agents or properties combined to produce a uniform result. Such laws are not mechanical forces, but the results of mechanical forces adjusted ("Meth. Div. Gov.," ii. 1) and implying a purpose. Professor Newcomb seems to feel a difficulty in understanding how there should be anything else than mechanism necessary to explain the course of nature. And yet he has been obliged to draw this very distinction without seeing its meaning: "In this work we have to be concerned with two things—the general laws of nature, as they are familiarly called, and the facts or circumstances which determine the operation of these laws."

The Professor imagines that final cause implies "interference" and "miracles," and says: "We are not to call in a supernatural cause to account for a result which could have been produced by the action of the known laws of nature." But according to the view of the great body of the supporters of final cause, and according to the view now presented, we do not need to call in a "supernatural cause," for all may be performed by the known laws of nature. Nor do we need an interference to bring about the special designs of God, say to send blessings, when God so intends it, to reward the good; or judgments when He means to arrest the evil, or to give an answer to prayer for things agreeable to His will. There is no interference with the machine in a factory when it lets off its cotton, or its linen thread, or its paper; it was planned and adjusted for this very purpose. The grain-reaper is all mechanical, and it has no conscious design; but it throws off and binds its sheaves for an evident purpose. So in the far grander machinery of nature it is arranged that good is encouraged and evil so far restrained and punished. True, the mechanical forces work blindly: they know not and do not care for the consequences; but these were all foreseen by One who appointed them and arranged them for the accomplishment of grand purposes, and small ones —as we reckon them; for the progress of the world in knowledge and civilization, to adorn that lily, to feed that raven, to secure that the sparrow cannot fall to the ground, and protect, in answer to prayer, the widow and the fatherless.

I could show, if the time allowed or the subject required, that there is a wonderful correspondence between the scientific doctrine of the uniformity of nature and the Scripture doctrine of foreordination. They are the same truths; the one seen from below and from the earth, the

other seen from above and from heaven. Both imply that every thing is fixed; but both also imply that every thing is arranged to accomplish special, and these beneficent, ends. Nature is uniform, and as we perceive it to be so, we proceed to use that very uniformity. Every thing is ordained, and believing that prayer is one of the ordained means, we use prayer to secure our ends—these ends being agreeable to His will. Because nature is uniform, we do not, therefore, on account of speculative difficulties, refuse to toil for our food. Just as little does the Christian, because of infidel objections, refuse to pray for blessings such as God is ready to give; and he finds that the blessing has been ordained and comes at the proper time, and in answer to the prayer which has also been ordained, and this to secure its end.

Professor Newcomb quotes, without naming me, my defence of Providence in my work on "The Method of the Divine Government," and objects to my statement that a rock may fall at a prearranged moment and kill a person beneath it. He says "the moment is fixed entirely by antecedent circumstances, such as the solubility of the rock and the amount of water which percolates over it. At that very moment the rock begins to fall." Now I agree with all this. But he himself has admitted that there are "facts or circumstances which determine the operation of these laws." The question arises who arranged these "facts or circumstances," which are needed, however far we go back beyond the nature of the rock and the water, and which imply an arrangement from the beginning? He acknowledges that if we had sufficient capacity we could from a knowledge of the causes (including always their adaptations) predict all that would follow. But if this be so, may we not conceive of a Being who not only foresees but has arranged all that follows? That Being might so

arrange them that special ends are accomplished, and these such that they are obvious to every thinking mind.

Nor are we, in discovering these ends, going into the region of speculation, to which the Professor allots every thing but mechanical cause. He talks of science, meaning mechanical, concerning itself "with phenomena and the relations which connect them." I am sure that the same intelligence which can discover the connections and relations in mechanical cause is all that is needed to discover the combination of causes which constitutes final cause. As M. Janet puts it, "The error of the scientists is in believing that they have eliminated final causes from nature, when they have shown how certain effects result from certain given causes." "We must not say 'that the bird has wings in order to fly; but that it flies because it has wings.' But wherein, I ask you, are these two propositions contradictory? In assuming that a bird has wings in order to fly, must not its flight result from the structure of these wings? Consequently, because the flight is a result, is it right to conclude that it is not at the same time an end? Would it then be necessary, in order to recognize final causes, that you should see in nature effects without a cause or effects disproportioned to these causes?"

We are in danger at this present time of a whole swarm of young naturalists, following one or two leaders, attacking final cause without knowing what it means. We are happy, in these circumstances, to have a work by a French philosopher which rests the doctrine on the proper footing, and corrects the misapprehensions of objectors. It is not necessary to give an epitome of M. Janet's "Final Causes." Those interested in the subject will go directly to the work now so accessible. Any one perplexed may here have his thoughts cleared up. Those who would oppose final cause must attempt to answer it, and as they do so they may find

every objection to the doctrine effectively disposed of. He shows first as a matter of fact, and this independent of any theological bearing, that there is finality or teleology in nature. He founds "the existence of the final cause on this principle, that when a complex combination of heterogeneous phenomena is found to agree with the possibility of a future act which was not contained beforehand in any of these phenomena in particular, this agreement can only be comprehended by the human mind by a kind of pre-existence in an ideal form of the future act itself, which transforms from a result into an end—that is to say, into a final cause." He shows, secondly, that this teleology implies an intelligent cause.

He is particularly successful in showing that development, so far from superseding final cause, implies it throughout. Hugh Miller had said, in criticising the "Vestiges of Creation," that development does not affect the argument for the Divine existence. Professor Huxley allows this fully. Professor Asa Gray discovers an order and design in development. But M. Janet has discussed the subject more fully. No one will maintain that development is a simple mechanical law. It is the law of a most complicated correlation of forces, most of which are as yet unknown. When these are detected, by some Newton of physiology yet to appear, it will be seen that development, always kept within its proper sphere, more perhaps than any other process of nature involves a complexity of adjustments all tending toward a point, the preservation, and I believe the gradual elevation, of plants and animals.

Professor Newcomb's discourse is on the Course of Nature. But there is vastly more in that organized course than he and other scientists are noticing. I have endeavored to spread out that rich web, of which the forces which he has looked at are the mere threads. I have proceeded on

the fourfold explanation of nature by Aristotle, only modifying it somewhat to adapt it to modern science. All that I insist on is that nature cannot be understood, except by such principles as those I have been unfolding. I discover not only force which hurries on like a railway train, but rails to restrain it and intelligence guiding it. I find not only mechanism, but machines constructed for ends. The mechanical doctrine, if carried out exclusively, would strip nature of all that endears it to us—of all its sunshine, of all its beauty and beneficence, and leave nothing to call forth our admiration, our gratitude, our love. A skeleton is an interesting object to an anatomist, but I love to see it clothed with form and color and expression. I am interested in the restless activity of nature, capable of working such effects for evil or for good; but I do not feel assurance, and my soul is not elevated to adoration till I see the powers harmoniously joining to produce regular laws, and types after their kind, and intelligible species, and special ends of support and benignity. Pythagoras uttered a profound truth, and had doubtless glimpses of its meaning, when he said that if men's perceptions were sufficiently acute they would hear the music of the spheres, being, I may add, the voice of One boldly represented by an old prophet as "joying over His works with singing."

III

DEVELOPMENT; WHAT IT CAN DO, AND WHAT IT CANNOT DO

DEVELOPMENT

WHAT IT CAN DO AND WHAT IT CANNOT DO.

The phrases Development and Evolution, so frequently used in the present day, have much the same meaning. Both point to one operation seen under somewhat different aspects. Development is the process going on, whereas evolution rather refers to the process as we look back upon it. We speak of the seed developing into the plant, and the plant being evolved from the seed.

There is a constant employment of the phrases and a continued reference to the process. But there is an equally persistent avoidance of an explanation of its precise nature. Instances, many rich and varied, are given, and inferences legitimate and illegitimate are drawn; but there has not been a wise, judicious, and scientific attempt to explicate its components, to spread out its contents, and prescribe its boundary.

The phrases are used to cover all sorts of meanings—"it is a great sheet let down by the four corners upon the earth, wherein are all manner of four-footed beasts and creeping things of the earth, and fowls of heaven." Evolution in itself is a great vehicle moving on from age to age, and from world to world, carrying with it all sorts of wares, precious and baser metals, suns and soils, flowers

and weeds. Scientific men discourse profoundly of the development of worlds and systems of worlds, of plants and animals, of individuals and of species, from the monad on to man. But we hear and read also of the development of the resources of a country, of its wealth, its mines, its gold and silver; its crops and corn, its wheat and fruits; of its sheep, cattle, and horses; of its industry, its trade and commerce; of its cities, their streets, houses, and harbors; of its education, its colleges and schools. They give you histories of the development of the sciences of astronomy, chemistry, and geology, of literature in prose and poetry; of language from its simpler forms up to the higher, such as Greek, German, or English; of the fine arts, as painting, sculpture, and architecture, from their ruder to their highest shapes; and of the useful arts, as masonry, carpentry, and engine-making. They talk, too, of the evolution of things from a simpler to a more complex state; of pottery, of wax-work, of metal-work, of vases, of dinner-sets, and tea-cups. It must surely be a comprehensive phrase, or quite as possibly a loose and ambiguous one, which embraces all these things and a thousand more.

In these circumstances it is surely of moment, when any one is talking of development, for or against, to insist on his telling us precisely what he means by it. "I am sick," says the man of common sense, who is not to be taken in with high-sounding phrases, "of this pretentious power; I prefer the old way of speaking, when it was believed that all things came from God." But I ask this man, who is after all making large pretentions to uncommon sense, whether he is prepared to affirm that he was not developed from his good father and mother; whether he, the man of forty, has not grown out of that boy whom he pleasantly remembers going to school at the age of six. But I am a religious man, he tells us, and I am sure that

God and not development guides the universe. But if he will listen to me, I venture to ask him whether he has any right to dictate to Deity how he shall govern his own world; whether by development or in some other way; whether God may not have made this man himself to grow by development; and whether the same God has not evolved the Christian from the Jewish faith, and the Jewish from the patriarchal. When we lay down the rigid rule for ourselves, that we explain beforehand what we mean by the phrases we employ, we are in a better position to require the same on the part of our opponent, and to insist on knowing what he means by the evolution he is defending. An evolution out of nothing? An evolution without a God to set it agoing or to guide it? An evolution of life from the lifeless? Of mind from the mindless? Of man from the monkey? Of the monkey from the mollusc? Of the mollusc from the monad? Of all from the senseless molecule?

SECTION I.

DEVELOPMENT IS AN ORGANIZED CAUSATION.

Development is evidently not a simple power in nature, like mechanical force, or chemical affinity, or gravitation. It is clear that there is a vast, an incalculable number and variety of agencies in the process, whether it be the development of a sun from star-dust, of the plant from its seed, of the bird from its egg, the horse from its dam, of the threshing-machine from the flail, of the reaping-machine from the reaping-hook, of our present kitchen utensils from those used by our grandmother. The question arises: Is there any unity in "the thousand and one"

things that act in the process? I believe that there is. Let us inquire what it is, and this will settle for us what truth and what error there is in the common expositions, that is development of developments.

The one common quality in the process as denoted by the phrases is, that one thing is developed into another thing, and that one thing is evolved from another. But it is universally regarded as settled that when one thing produces another, or is produced out of another, it is by causation. It follows that there must be causation in development. Causation necessitates development. This follows from the nature of cause and effect as it is commonly apprehended. It follows more particularly from the view which I have given of Energy in the paper on the subject in this series. I have shown that in physical action the cause always consists in two or more bodies which act on each other, and that the effect consists of the same bodies modified; that the ball A striking the ball B constitutes the cause, and that the effect consists of the ball B gaining the energy which A loses. But I need not insist on this here, as whatever be our theory of causation, the cause must be regarded as developing the effect, and the effect as evolved from the cause.

It has been generally admitted for the last two or three centuries (it was anticipated in a vague way from the commencement of reflection) that causation works through all nature, not only divine causation but physical causation, that is, that the ordinary occurrences of nature are produced by agents acting causally. In other words, fire burns, light shines, and the earth spins round its axis and rotates around the sun, and as the issue we have heat and light, and the beneficent seasons. Men of enlarged minds do now acknowledge that in the doctrine of universal causation, of God acting everywhere through second causes,

there is nothing irreligious. On the contrary, the circumstance that God proceeds in a regular manner which can be anticipated, is evidently for the benefit of intelligent beings who can thus so far foresee the future and prepare for it and act upon it. But causation leads to development. If there be nothing irreligious in causation, as little is there impiety in the development which issues from it. It will be shown that development by causation is the plan by which God carries on his works, thus connecting the past with the present, and the present with the future. It was my privilege in my earliest published work to justify God's method of procedure by natural cause and natural law, as specially adapted to man's constitution.[1] I reckon it as a like privilege in my declining life to be able to defend God's way of acting by development, which gives a consecutive unity to all nature, and as a stream from the throne of God flows through all time, widening and deepening till it covers the earth, as the waters do the sea, with the riches it carries.

But development, while it is carried on by causation, does not consist of a single chain with successive causes and effects as its links. The causes as they operate combine and the effects are joint, and we have a great reticulated machine. Development is essentially a combination of causes. It is a corporation of causes for mutual action, an organized causation for ends. The past has developed into the present, which will develop into the future. The configuration of the earth, its hills and dales, its rivers and seas, which determine the abodes and industries of men, and the bounds of their habitation have been produced by agencies which have been working for millions of years. The present is the fruit of the past and contains the seed

[1] Method of Divine Government, Physical and Moral.

of the future. The plants now on the earth are the descendants of those created by God, and the ancestors of those that are to appear in the ages to come.

There is through all times, as in the year, a succession of seasons; sowing and reaping, sowing in order to reap, and reaping what has been sown in order to its being sown again. This gives a continuousness, a consistency, to nature amidst all the mutations of time. There is not only a contemporaneous order in nature, there is a successive order. The beginning leads to the end, and the end is the issue of the beginning. This grass and grain, and these forests that cover the ground, have seed in them which will continue in undefined ages to adorn and enrich the ground. These birds that sing among the branches, and these cattle upon a thousand hills, will build nests and rear young to furnish nourishment and delight to our children's children in millennial ages. Every naturalist has seen a purpose gained by the nutriment laid up in the seed or pod to feed the young plant. I see a higher end accomplished by the mother provided for the young animal. That infant is not cast forth into the cold world unprotected: it has a mother's arms to protect it and a mother's love to fondle it. Development is not in itself an irreligious process; every one who has been reared under a father's care and a mother's love will bless God for it.

SECTION II.

DEVELOPMENT IS CAUSATION WORKING IN AN ENVIRONMENT.

Science has not determined, and never may be able to determine, what are the original constituents of the universe. Some are fond of looking upon them as atoms, some represent them as centres of force, others will allow them to be

only centres of motion—with nothing to move! Whatever they be, there must be millions of millions of them working in the knowable world.

It is by no means certain that we have been able to determine what is the number of elementary bodies in the world. The ancient Greek division into earth, water, air, and fire, merely pointed in a rude way to a division of states—the solid, the fluid, the vaporous, and the ethereal. The number of elements is supposed for the present and provisionally to be sixty-five, but most chemists believe that some of these may be resolved into components.

It would be wrong in us to affirm dogmatically that we know what are the varied forces, or, as some would prefer expressing them, the powers of producing motion. One point, however, has been established in our day, that all the physical energies are in a sense one; that they are all—be it the mechanical, chemical, vital, electric—correlated, and that their sum, real and potential, cannot be increased or diminished.

What we have to do is to observe these entities, elements, or powers as working, and to notice in particular that they operate in the way of evolution.

These existences, with their energies, combine to form causes, and these form combined or organized causes. All of them have affinities with each other. Some of these are stronger than others in themselves, or from the relative position which they occupy. These combine in their action. We may represent the agencies at work by the letters of the alphabet, A, B, C, etc. A number of these, say A, D, P, S, may join and produce powerful individual occurrences —an earthquake, a volcano, a conflagration, a revolution. Or they may abide and produce general issues, continued for hours, or days, or years. Thus the winds combine and go in currents, and we have the trade-winds. Thus the

waters of the ocean are made to flow in one direction, and we have the Gulf Stream, and the cold wave from Labrador.

But these organized causal operations do not embrace, in at least an appreciable or calculable manner, all the powers or causes of the universe; they comprise only a portion as in conspicuous operation. The causes that produce a cyclone in the Indian Ocean, may have no perceptible connection with those that produce a flood in the rivers of America. The moral agencies that produce a revolution in Paris, may have no visible relation with the discontent which leads the Indians to rise and murder their white neighbors in America. But there is no set of causes in our world so isolated that they have no connection with surrounding causes. Possibly A, D, P, S have some relationship with B, E, Q, T. These other powers will so far act on the organized causation and modify it, it may be in the way of strengthening or weakening the tendency, or giving a special direction to the stream. While they do so, they will themselves be affected, perhaps be absorbed or driven off. The winds and ocean currents are all affected by the nature of the land over which they travel. The tides are directed by the nature of the shore, and the seasons, by, it may be, various solar or lunar influences. Every combined mundane agency has a sphere, and this sphere has an atmosphere, or an evironment as it is called, which it so far sways, and by which it may be swayed.

SECTION III.

REGULAR RESULTS FROM COMBINED CAUSATION AND ENVIRONMENT.

The former is a stream receiving contributions as it flows on from the other, which constitutes its banks, that are watered by it, it may be formed by it. From the inter

action, specially from the unions and separations, there follow certain regularities which are worthy of notice.

There are courses which go on for a time and then disappear. The wind arises from there being a comparative vacuum somewhere, into which it rushes, and then sinks because the inequality is so far filled. There is a high tide produced when the moon and sun are pulling in one way, but it ceases when the two are not acting in unison. There are epochs in which certain motives or impulses prevail—periods of war and conquest, periods of commercial enterprises, periods of the cultivation of the fine arts; these have public opinion for a time in their favor, and then give way before something else. In all such cases the combination of the causes producing the movement is loosened and new combinations are formed.

There are results that abide the same from year to year, and from age to age: that stream has for a thousand years risen in the same fountain, among the same hills, and flowed through the same valleys into the same creek of the ocean. Thus there are plants and animals now living which have not been visibly changed since they appeared millions of years ago in the early geological ages. The Chinese have continued much the same in character, occupations, and mode of life, for thousands of years. In all such cases the same causes have continued to act and produce the same effects. In other cases there have been irruptions, convulsions, and wars which have produced new modes of life; such, for instance, was the irruption of the hordes from the northeast upon the decaying Roman empire.

The most curious instances of regularities are those which are periodic. A certain combination of causes produces certain issues, and is then dissolved, to be succeeded after a certain time by the formation of a like combina-

tion and the same issues following. It is thus that at certain seasons there are daily sea-breezes and daily land-breezes. As more marked and obvious we have the seasons. "While the earth remaineth, seed-time and harvest, and cold and heat, and summer and winter, and day and night shall not cease." Here we have sun and seed and soil concurring to produce an orderly series of events which run their course and are succeeded by a like series. Malarial influences are introduced into the system, which take a certain time to work and to be cast off; and we have diseases lasting four days or ten days or fourteen days. We have such a periodic process in every plant springing from a seed, and every animal from a germ, having a growth and an average life and then dying, but first producing a new life. We have such periods in the movements of the heavenly bodies, as in the precession of the equinoxes.

It is more to our present purpose to remark that in development there is usually progression. At times indeed there is degeneracy, as when plants do not thrive in a niggardly soil, and animals get weaker in a deleterious climate. But, upon the whole, there has been an advance in our earth from age to age. The tendency of animal life is generally upward, from all fours to the upright position, from which men can look up to heaven. There are species of plants and animals which have become larger and more robust. Geological causes made our earth fit for the abode of man, who had cereals and cattle provided for him. Human beings have come to occupy places which in earlier ages were handed over to wild animals. There is now a larger amount of animal food than in any previous age. As the ages roll on there is a greater fulness of sentient life, and a larger capacity of happiness. The average life of human beings in civilized countries is in-

creasing. The intellectual powers have been made stronger and firmer, like the trunk of a tree, and the feelings, like the flowers, have been made by culture to take a fuller expansion and a richer color.

Under this head may be placed those grand generalizations which have been so magnified by Herbert Spencer in his "First Principles." He assumes a Persistence of Force in the universe, derived from an unknown and unknowable power beneath it. This leads to a constant differentiation and integration; in simpler terms, a separation of elements, and again an aggregation. He shows that "any finite homogeneous aggregate must lose its homogeneity, through the unequal exposure of its parts to incident forces." Hence the instability of the homogeneous and the perpetual motion in the universe. This scattering issues in an integration. The result is to change an indefinite homogeneity into a definite heterogeneity, and then aggregates of all orders are evolved. Everywhere there is a change from a confused simplicity to a distinct complexity, from a diffusion to a concentration. But opposed there may be a more powerful attraction which separates and diffuses the aggregate: "Evolution and dissolution as together making up the entire process through which things pass." "There is habitually a passage from homogeneity to heterogeneity, along with the passage from diffusion to concentration." This may be expressed in terms of Matter and Motion, "and if so, it must be a statement of the truth that the concentration of Matter implies the dissipation of Motion, and that, conversely, the absorption of Motion implies the diffusion of Matter." In the end, to the vast aggregate, even to the earth itself, Dissolution must eventually arrive, and "universal Evolution will be followed by universal Dissolution."

These generalizations are very wide, and the conclusions

far reaching. Possibly there may be gaps in the processes. The giant, in marching on with his seven-leagued boots, may have overlooked many agencies which modify his theories. He is wrong in declaring that the power underneath the persistence of force is unknown and unknowable. According to his own account it is so far known, it is known to be a power, and a power persisting and working certain effects. It can be shown to be a power characterized by wisdom and love. He omits certain powers which are as patent as those he notices. In particular he regards mind as consisting of nerves, and overlooks all its special properties—of intelligence, conscience, and will. When these are introduced they give a new, and, I venture to say, a juster and more attractive aspect to the whole of nature. I am not satisfied when I find myself and my friends represented as mere developments from homogeneous matter, produced by differentiation. But I am willing to accept his generalizations so far as the physical powers of nature are concerned.

SECTION IV.

EVOLUTION IN INANIMATE NATURE.

"Evolution," says Herbert Spencer, "is a change from an indefinite incoherent homogeneity to a definite coherent homogeneity through a continuous differentiation and integration." I am willing to take this doctrine, but I have to unfold it in my own way, which will be less technical, but fully as accordant with facts.

In nature there is a very large, but still definite number of bodies, all acting causally. As they act a number are drawn into aggregates by their mutual attractions or af-

finities, or their proximity. The action is of the nature of causation ; I call it a combined or organized causation. Thus, in our mundane system, we have the sun, planets, and moons, with a certain shape—an oblate spheroid—with a rotation round their axes and round each other. These may be regarded as developments produced by differentiation. As a result of the collocation of the sun and the earth we have the seasons, with their regularities and their irregularities. We have also had the stratified structure of the earth, and mountains heaved up, and valleys between. All this has arisen very much from combined causation. In the aggregates produced there are internal changes going on. Thus the earth is supposed in the geological ages to have become cooled and fitted for the abodes of animated beings. But the combination of causes is in the centre of an immense number of other causes, which may be called its surroundings, or, more technically, an environment. The aggregate and its environment act on each other and produce farther changes, it may be in accumulation, say in adding plant-fostering soil on the earth's surface, or washing away seas and increasing dry land.

But there is a second characteristic of development observable everywhere in nature, and that is a progression. There is an advance from a homogeneous to a more differentiated state in which new aggregates with their functions appear. This may be produced by accumulations of forces breaking out in convulsions, which change so far the face of the earth ; or more frequently by small increments, as the growth of soil by the decay of plants.

In all this I discover order and design. I do not see that the constituents of the world, its atoms or molecules, necessarily produce beneficent results. If left to themselves they might produce evil quite as easily and naturally as good, and might have been formed into destructive

machines and pestiferous creatures, into flaming meteors with burning worlds, into serpents and wild beasts devouring each other and arresting all forms of beauty and beneficence, and yet incapable of dying. But, instead of this, these million agencies combine to accomplish good and benign ends, so as to show that there has been a mind disposing them and an end in view.

Let us notice, first, that the combination of elements acting as causes has produced general laws and beneficent order: in the seasons, in the growth of the plant—first the blade, then the ear, then the full corn in the ear—in the animal enjoying its time, and handing down its life to another generation. All this is not the action of simple properties acting fortuitously or fatally; it is the result of the adjustment of numerous properties of matter—gravitating, mechanical, chemical, electric—all conspiring toward an end.

Secondly, the combination accomplishes special ends, such as those so happily illustrated by Paley and other writers on natural theology. There are, for example, the joints of the bodily frame composed of bones that fit into each other for good ends, namely, easy and convenient movements; the firm clasping of the hand, and the simple forward and backward motion of the fingers, and the ball and socket at the shoulder admitting rotation all round. There are the bodily senses—the eye, the ear, and touch—so delicately adapted to the external world, with which they make us acquainted. There is the whole animal frame, made up of various parts, yet all combining into a living machine of exquisite structure.

Not only is development, when properly understood, not inconsistent with religion, it will be found that the combination and adaptation in it clearly argue design. Sooner or later there will be written a work on natural theology,

after the manner of Paley, showing that as there are plan and purpose in the well-fitted limbs and organs of animals, so there is also design, and this quite as evident and as wondrous in the way in which, by a process running through ages, the bones and muscles have been adjusted to each other to produce the horse we drive or ride on. There is a manifest beneficent end in the knittings of our frame, but there is quite as palpable a purpose in the way in which all the parts have been moulded in the geological ages, and handed down by heredity.

I therefore see design in development. There is an obvious end and a means arranged to accomplish it. We notice purpose evident in the development which man is ever accomplishing. The farmer uses a series of agencies to secure a crop: he ploughs, he harrows, he sows seed, he weeds, and in the end he gathers in a crop. The teacher lays out a plan for developing the faculties of his pupils: he imparts knowledge, he corrects, he stimulates, and he reaches his aim, the improvement of the mind and a fitness for the duties of life. We are ever noticing cases in which there is need of co-operation to accomplish an end. A house is built and furnished because a number of persons have done each his part—the mason, the carpenter, the plumber, the slater, the glazier, the upholsterer. A city becomes rich because the merchants have been far-sighted, the manufacturers expert, and the tradesmen skilful and industrious. The country prospers because the master and the servant, the schoolmaster and the minister of religion, are all and each doing their part. But there are still more wondrous evidences of plan, as in the succession of the seasons, of the grass and grain and trees, and in the living creatures advancing in fulness and strength, in activity and beauty. It is not in the single operation that we discover evidence of a purpose so much as in their

organization and orderly succession and development. Development is a sort of corporation in which each part, like the citizen, fulfils its office.[1]

Evolution is not, any more than gravitation, chemical affinity, or any other power or law of nature, an irreligious process. Spencer accounts for all its operations by the persistence of force beneath, and behind which he feels himself obliged to place an unknown power. I, too, am obliged to place such a power; but to me it is so far a known power. There is more in the production than the persistence of force; there is an arrangement of all the evolved and involved powers to work for an end, and in this I perceive design and intelligence. I do not stand up for a development any more than I do for a gravitation independent of God. I see God in the persistence of force, and in the beneficent way in which it works. I can see a good purpose worthy of God served by universal gravitation, in binding together all the parts of the universe, however widely sundered. But I can also discover it to be a beneficent arrangement, whereby by evolution the present is connected with the past and the future, and the most remote times are brought together. I do not say that God could not have accomplished these ends in some other way, but he has actually effected them by means of causation and evolution, and I bless him for it.

I see God in development throughout, and from beginning to end. Because a rose, a dog, or horse is gendered by natural causes, it is not less the work of God. Our finest roses are derived from the common dog rose of Europe (*Rosa*

[1] I am not here constructing or defending the theistic argument. If it be objected that the existence of pain sets aside teleology, I simply say that I am not to enter on the subject of the mystery of evil, but I hold that there may be evidence of the existence both of suffering and of love in one and the same world.

canina): that rose with its simple beauty by the roadside is the divine workmanship; but so is the rose with the fullest form and the gayest color in our gardens. God, who rewards us for opening our eyes upon his works, gives higher rewards to those who, in love to him, or to them, bestow labor and pains upon them. Dogs, it is said, have descended from some kind of wolf. This does not make the highly developed shepherd or St. Bernard dog, with their wondrous instincts, not to be the divine workmanship. Just as little does the hypothesis that our living horse is descended from the pliohippos, and this from the miohippos, and this again from the small eohippos, which used to tread with its five toes on marshy ground, prove that the animal we ride on, so useful and so graceful, so agile, and so docile, is not the creature of the Creator who formed it and endowed it with the power of evolution.

SECTION V.

DEVELOPMENT IN ORGANIC NATURE.

There is no difficulty presented to the religious man in development, so far as it relates to inanimate nature; he may believe in evolution as a mode of divine operation. Doubts and difficulties arise when he is required to assent to its universal application to every form of organized being. But surely if it exists and is prevalent in dead matter without being atheistic it may also be allowed in plants and animals.

It is admitted on all hands to have a place and power in the individual plant and animal, both of which proceed from the seed or germ, take a typical form, and have a normal time to live and produce an offspring. There is a

sense in which the oak is in the acorn, the child is father of the man. Both grow partly by internal powers and arrangements, and partly by external nourishment and accretions from day to day, and from year to year. If any one regards this as taking place independent of God, he is so far an atheist. If he believes it to be accomplished by the power of God, he is thus far a true theist, and his heart may be filled with adoration and his mouth with praise.

Not only is there development in the individual, but also in the succession of individuals. There is here a rotation, the egg from the living being developed into a new living being, producing a new egg. It is equally true that the bird is from the egg and the egg from the bird, and both by evolution. No one will speak against such an arrangement, as it provides children for the comfort of parents and parents to care for children.

But disputes arise when development is carried farther. It is allowed that there is development in the individual, but may it also take place in the species? In other words, can one species grow out of another? To clear the ground for a fair discussion let us look at what is admitted.

It is allowed, nay, maintained, that there is such a thing in nature as distinct species, genera, and orders. These, in ordinary circumstances, cannot be changed into each other. The lily cannot be transmuted into the rose, nor the sheep into the goat. In the common operations of nature every plant and animal is after its kind or species. Figs do not produce thistles, nor do thistles produce figs.

It is also admitted by all that species develop varieties.[1]

[1] Prof. Asa Gray writes: "The facts, so far as I can judge, do not support the assumption of every sided and indifferent variations. The variations do not tend in many directions; the variations seem to be an internal response to external impressions."

I believe there is no one tree—oak or pine, elm or birch—precisely the same in the old world and in the new. What a variety of pigeons are there, all descended, it is supposed, from the rock pigeon. These varieties are produced internally, largely by external circumstances, that is, by the environment. In a barren soil and a severe climate an oak will become dwarfed and its descendants will be the same. The dog can be trained to point at game, and a breed will be produced possessing this aptitude. It has to be added that these varieties tend to return, if the environment does not continue to prevent it, to the original type of the species. The cultivated plant, cast out of the garden, will be apt to go back to its wild state. It is usual also that when animals of different species have paired, the horse and the ass for instance, the offspring—the mule—is not prolific and dies out.

We have approached the battlefield gradually, but now we are in the midst of the fight, and we may watch it, even though we do not take part with either side. Two grand questions are before us. One relates to the production of the species at the first. Were the species of amœba, of molluscs, of insects, of fishes, of reptiles, of mammals (the consideration of man had best be deferred) created, very much as they now are, by the immediate fiat of God at the beginning, or as the ages rolled on? Or were they evolved out of a previous material by internal laws of development and by constant increments from the environment? The second question is intimately connected with the first, In rare and extraordinary circumstances can new species come forth out of the old, as varieties do, and these go down by heredity?

The opinions of the ancients on such a subject are of no value, as they have no scientific basis. Many deep thinkers believed in spontaneous generation, and supposed that

lower animated creatures came out of the sea or bubbled out of marshes, and they did not see anything irreligious in this, as they, or at least a number of them, believed it to be done by a divine power. In the earlier centuries of the modern era, naturalists were carefully observing the species, genera, and orders, with the view of classifying plants and animals, and they were fond of regarding kinds as fixed and immutable. Religious people were inclined to regard all natural species as created by God, and this required, when they came to believe in geological succession, a perpetual creation down to the period at which man appeared. Since the days of Mallet and Geoffroy St. Hilaire there has been an ever-increasing body of naturalists inclined to account for the origin of species by natural law.

Who is to settle these questions, or rather this question, for it is one? This can be done only by long and varied observation and discussion. I certainly feel as to myself that I cannot decide it. The tendency of modern speculation has all been toward the prevalence of development by natural causation. Yet there are phenomena of which it may be said that they cannot at this present time be explained by any natural process. But there is one point on which I am quite as much entitled to speak as any other is: Does religion require us to insist that species and orders in natural science are all fixed forever? that in no circumstances can a new species be produced by natural law?

It is certainly conceivable that the God who created all things should also have created by a direct act, without a medium or without a process, the first member of every one of the hundred thousands of plants and animals on the earth, and then allowed, or, rather, enabled, them to go down by an evolutionary heredity. But it is quite as possible and equally conceivable that God may have organized

the species out of the previously existing materials, even as he made man's body out of the dust of the ground. The essential elements of organisms are oxygen, nitrogen, hydrogen, carbon, with sulphur and iron, and aqueous fluids. These are represented as being the least volatile of the elements and the most permanent in their combination, and because of these qualities they may have been brought and kept together in organisms. It is quite conceivable that out of the constituents of the universe God may have arranged that these should combine to form those aggregates which we call plants and animals, and as the ages run on, to form new species in rare and exceptional circumstances. It has to be added that these elements will not of themselves form living beings without some inherent or superadded hereditary vital power, a subject which will have to be considered separately. Now, it is not for me to say beforehand which of these methods, immediate or mediate, God should adopt. The former of these might seem to bring in God more directly. It certainly makes him interfere more frequently with the works of nature; but then, when he is thus interfering, he is interfering with his own works, which we may suppose to have been planned from the first in infinite wisdom. If it be found in fact that he has chosen the latter method, we are just as much entitled in that case as in the other to discover the action of God, and we may without presumption discover evidences of beneficence. For God does thus secure not only a connection of his works with himself, but a connection of them one with another; and thus, on the one hand, there is a certain stability in natural classes, while, on the other hand, there is a sufficient amount of variety and progression to suit the organism to new positions and provide for the survival of the fittest, which is certainly a good provision.

A number of theories have been devised to account for the production of what seem to be new species. Darwin gives prominence to the principle of Natural Selection, with its accompaniment the Survival of the Fittest; but acknowledges in his later editions that he had attached too much importance to it. The phrase is not a very happy one, as it seems to imply choice, which certainly has no place in the process. But it points to a fact that the weakest plants and animals are most apt to die early and leave no progeny, whereas the strong live and have a more powerful offspring. I do not purpose to give all the theories, or to examine them critically. They differ chiefly in this, that some attach more importance to the operation of the internal elements, others to the external circumstances or environment. Some hold that there is an action producing change, variety, and progression in the components and structure of the organism, in the germ or in its growth. Among those who thus look for the cause of the development in the organs themselves may be mentioned Lyell, Mivart, and Professor Owen, in England; Professor Gray, and Professor Cope in America; and, in Germany, Braun, Gegenbaur, Heer, Nägeli, Virchow, etc.[1] Most of them seem to make the development proceed by gradual steps, scarcely if at all observable; others through a metamorphosis of germs and heterogenetic leaps. Perhaps we may have to take with us both the internal and external causes, in some cases the one, and in some the other being the stronger. The development of the individual certainly involves both an inward power of

[1] We have an admirable work on The Theories of Darwin, by Rudolph Schmid, excellently translated by G. A. Zimmermann (Jansen, M'Clurg & Co., Chicago). This work is at once philosophical and scientific, and being now so accessible, renders it unnecessary for me to state and criticize the theories of evolution.

growth, and also external support and nutriment; both are necessary to produce the full form, and the seed which propagates the species. There may be the same principle in the production, in rare circumstances possibly only in the early geological ages, of new species. It is conceivable that in the earlier times aggregates might not have been so fixed as to render germs and species absolutely unchangeable. They seem now to be so determined that the species of animals and plants are comparatively permanent.

It is always to be remembered that in vegetable and in animal development there is more than mechanical energy. Mr. Spencer can scarcely be said to have perceived this; certainly he has not given it its due place and prominence. There is evidently a chemical power in exercise, and this cannot be said to have yet been resolved into mechanism. Then there is a power, which without defining it, was simply called vital by our older naturalists, and which, however it may have been produced, and whatever may be its nature, is in actual operation higher than either the mechanical or chemical. Even Darwin is obliged to bring in a panzoism to account for the genesis and continuance of organisms. Mr. Spencer himself has to use physiological units to explain heredity. What are these but particular exhibitions of the old vital forces?

Perhaps the most remarkable example of this physiological development is to be seen in the progress of the embryo in the womb, as discovered by Von Baer. The germ is apparently (it cannot be so really) much the same in all animals except the lowest; but it becomes differentiated and takes the form of the polyps, the worms, the molluscs, and arthropods, and goes on to the fish, the amphibia, the reptiles, to birds and mammalia. Now this progression, as every one knows, is very much the same

as that of the animal races in the geological ages. This does not imply, as I understand it, tha the germ of the mammal, in its ascending process, ever does become a bird or a reptile. It means that there are combinations of agents in the germ and its surroundings, which proceed, that is, are developed after a certain manner, and that from a prearranged combination of matters and forces there has been a like or parallel progression in the whole animal kingdom. All this implies more than mere mechanical energy or persistence of force. Powers are implied, which, in the present stage of science cannot be resolved into the mechanical. Yet in no human machine can we discover more clearly the evidence of a plan and purpose. With these new powers acting, there is now a higher manner and form of development, and we have one generation of intelligent and moral beings succeeding another.

SECTION VI.

WHAT DEVELOPMENT CANNOT DO.

While it can do much, it may not be able to do everything. There is a tendency among eager and hasty thinkers to push every newly discovered truth to an extreme. I am as old as to remember the feeling kindled when Sir Humphry Davy made his brilliant discoveries as to electricity and chemical action. There were sciolists in our schools of popular science, book critics in our newspapers, and wandering lecturers who hastened to make electricity account for everything, for even life and mind itself. This scientific fashion, never encouraged by the great discoverer himself, soon ran and ended its course, and died out in

the struggle for existence as other and equally powerful agents came into notice. Evolution is at present running a like course. The great scientific work of the past age has been to show what it can do; that of the coming age is to lay a restraint upon its career, and to show what it cannot do. Like all creature action it will be found to have very stringent limitations. We may fix on some of these.

I. It cannot give an account of the origination of things. This is implied in its nature and its very name. Development takes place among materials already existing. Evolution is the derivation of one thing from another thing. But the mind does seek after an origin. This has been maintained by Aristotle, and by the profound thinkers of all ages. The principle of causation insists on going back from effect to cause, and from one cause to another, and is not satisfied till it rests in an originating substance possessed of the power to produce all that follows. Evolution implies a set of acting substances. So far from accounting for these, say body with its attractions and affinities, and mind with its thoughts and feelings, it presupposes that these exist and that they are acting. The mind seems to demand an account of these; development cannot furnish this, and has to call in a creator and organizer. Evolution simply shows a flowing and widening stream, implying a fountain, which, however, it conceals in mist.

II. It does not originate the power which works in development. That process shows us objects acting causally, but takes and gives no account either of the objects or the forces in them. To account for them, Herbert Spencer calls in what he denominates the Persistence of Force—a phrase to which some object. But call it what you please, force or power or energy, or the persistence of force, or

the conservation of energy, there is certainly such a thing, not imaginary or hypothetical but real. Spencer thereby accounts for all the action of nature. But he is philosopher enough to know that this implies something behind, beneath, or above it. He is obliged to do this by the nature and necessity of thought. He is constrained to believe this because it is impossible to conceive the opposite, which, according to him, is the ultimate test and criterion of truth. I am not disposed to put the argument in this form, but I join him in holding that we are necessitated to believe that there is a something beyond the matter and force which we notice. With him this is unknown and unknowable, and he kindly and condescendingly makes this the sphere of religion. Yet he himself is obliged to acknowledge that he knows something about it. Indeed it is impossible for him or any one to speak about it, to make any predication of it, unless he so far knows it. He knows it to be a power and to have power; and surely this is knowledge, and rather important knowledge. He everywhere speaks of a necessary "belief in a power of which no limit in time or space can be conceived." This limitlessness is surely a farther knowledge. He can tell a great deal about its working by differentiation and integration, producing happiness and virtue, causing an advance, and finally dissolving all things in a universal conflagration. Such a thing is not absolutely unknown. I agree with him in thinking that there is, that there must be, such a power. But on the same ground as he argues that it exists and is a power, I argue that we know it to be not only a power but a wise power, a benevolent, a righteous power. But evolution has not produced this power, it is the production of it.

III. Evolution of itself cannot give us the beneficent laws and special ends we see in nature. There is in force,

considered in itself, neither good nor evil. It is as ready to work destruction as to promote the spread of happiness. The persistence of force might be a persistence in evil. The separate agencies being blind might as readily produce confusion as order. A railway train, without a head or hand to put it on the right track, might only work havoc. In order to operate beneficently the persisting never-dying force must have collocations, as Chalmers calls them, adaptations or adjustments, as I call them, to enable them to accomplish the good ends which are so visible.

These are of two kinds. One is a general order, or what are called laws of nature, such as the seasons and the periods of animal life. I am inclined to see purposes in the very forms of animals and plants, and the manner in which they grow into their type, while the type ever advances as if to realize an idea. I discover an end in the manner in which plants and animals are produced. Two arrangements are necessary to effect this. First, there is the tendency of every living thing to produce a seed or germ. The powers necessary to accomplish this are very numerous and very complex, but all conspiring toward this one end, as if it were one of the purposes for which the plant was created. Secondly, there is the growth of the plant or animal from its embryo. This, too, implies an immense combination of arranged elements and forces. It looks excessively like an end contemplated, an idea to be realized. It looks all the more like this when we notice that the seed or germ is after its kind, and produces a new life of the same type.

I have endeavored to show in another work that in our world there is not only law and general government, but a particular providence accomplishing special ends.[1] The

[1] Method of Divine Government, Part II.

laws produce general results, but they are also made to conspire and concur and cross each other, so as to produce individual events, which, as far as we know, follow no general law. This is manifest in every part of God's government, but is specially seen in God's dealings toward his intelligent and sensitive creatures. "A sparrow cannot fall to the ground without him." Thoughtful minds have ever felt comforted by the thought that there is a God watching over them, and ordering their lot from beginning to end, sending health or disease at the proper season, gratifying their wishes or thwarting them, according as may be for their best good. All this may be done by the persistence of force, but it is by a force guided by intelligence and love. When man accomplishes any end, it is by working on materials already prepared for him. But the God who created the materials has also arranged them for the accomplishment of his purposes. There is need of a power above evolution to account for the beneficence of evolution.

SECTION VII.

NEW POWERS APPEARING IN THE AGES.

I HAVE shown that in physical causation there is merely a changed state of the bodies acting as the causes. A and B act upon each other and constitute a cause, the effect being simply A′ and B′ in a new state with no new bodies, and no added energy, the energy in the two A and B being the same as in A′ B′, with a portion in the one transferred to the other. In all such causation there is no energy in the effect which was not in the cause. If there be a new power appearing it must be superadded. But new powers have appeared.

For the purposes of my exposition, it is not necessary that I should determine what are the original bodies or powers in our world, what is their nature, and how many they are. They may be atoms, simple and indivisible, they may be molecules consisting of two or more atoms in union. These no doubt have all their powers by which they act.

Geology clearly reveals that new products have appeared. There was a time when there was no organism and no life, no plant or animal. But at a set time organized matter appeared, say protoplasm. When there was no animated being I believe that there was no sensation, pleasant or painful, and it certainly cannot be proven that there was any feeling in the protoplasm or in the plant. As ages roll on we have creatures evidently feeling pleasure and liable to pain. Organisms both in the vegetable and animal form rise higher and higher, and animals become possessed of impulses which prompt them to act in a certain way. We have now powers higher than the mechanical, we have the vital, the sensitive, and the beginning of the psychical. Häckel divides the organic world into three kingdoms—the protista, the vegetable, and the animal. He traces twenty-two stages in the rise from the protista on to man, eight of them belonging to the invertebrate and fourteen to the vertebrates. I am not disposed to sanction this pedigree and every stage of it. But it is clear that there is such an advance. In the animal kingdom there is first sensation, then instinctive impulse, then lower rising to higher forms of intelligence, distinguishing things that differ, conducting long processes of reasoning and induction, and giving us glimpses of spiritual and eternal truth. Finally, we have a moral nature discerning between good and evil, laying obligations upon us to promote the happiness, and as higher, the moral

good of man, and pointing to a judgment-day. Naturalists may be tempted to overlook these last, the high ideas of which we are conscious; but these are realities, are facts revealed to the inner sense quite as clearly and as certainly as the visible and tangible molecular and molar parts, the seed, the limbs, the joints, the nerves and brain, revealed to the external senses.

Was there Life in the original atom, or molecule formed of the atoms? If not, how did it come in when the first plant appeared? Was there sensation in the original molecule? If not, what brought it in when the first animal had a feeling of pleasure or of pain? Was there mind in the first molecule, say a power of perceiving an object out of itself? Was there consciousness in the first molecule or monad—a consciousness of self? Was there a power of comparing or judging, of discerning things, of noting their agreements or differences? Had it a power of reasoning, of inferring the unseen from the seen, of the future from the past? Were there emotions in these first existences? say a hope of continued life or a fear of approaching death? Perhaps they had loving attachments to each other, perhaps they had some morality, say a sense of justice in keeping their own whirl, and allowing to others their rights and their place in this dance! Had they will at the beginning, and a power of choosing between pleasure and pain, between the evil and the good? Perhaps they had some piety, and paid worship of the silent sort to God!

It is needless to say that there is not even the semblance of a proof of there being any such capacities in the original atoms or force-centres. If so, how did they come in? Take one human capacity: how did consciousness come in? Herbert Spencer, the mightiest of them, would have us believe that he has answered the question, and yet he

has simply avoided it. In his "Psychology"[1] he is speaking of nerves for hundreds of pages; he shows that in their development there is a succession of a certain kind; and adds simply that "*there must arise a consciousness*"! This is all he condescends to say, bringing in no cause or link or connection. Thus does he slip over the gap—a practice not uncommon with this bold speculator.

It is pertinent to ask, How did these things come in? How did things without sensation come to have sensation! things without instinct to have instinct? creatures without memory to have memory? beings without intelligence to have intelligence? mere sentient existence to know the distinction between good and evil? I am sure that when these things appear, there is something not previously in the atom or molecule. All sober thinkers of the day admit that there is no evidence whatever in experience or in reason to show that matter can produce mind; that mechanical action can gender mental action; that chemical action can manufacture consciousness; that electric action can reason, or organic structure rise to the idea of the good and the holy. I argue according to reason and experience that we must call in a power above the original physical forces to produce such phenomena. I may admit that a body may come out of another body by the powers with which the bodies are endowed; but I say that a sensitive, intelligent, moral discerning soul cannot proceed from the elements of matter. New powers have undoubtedly come in when consciousness and understanding and will begin to act. They may come according to laws not yet discovered, but they are the laws of the Supreme Lawgiver.

It will be argued by some that there must have been all along in the atoms a latent life, sensation, consciousness,

[1] Psychology, Vol. I., Sec. 179.

and mind, with beneficence and capacity of choice, ready to be developed in the æons, some in thousands and some in millions of years. Those who deny that any new powers have appeared must resort to some such supposition. It may be allowed that this is a thing imaginable and possible, but there is not the semblance of a proof in its favor. Certainly there is no evidence that sentient beings could have passed through the intolerable heat of the star-dust from which our former worlds are supposed to have come. Even if we should discover proof of this, we should, in the very fact, have proof of design in the way in which these latent powers have come forth at the appropriate times, and continued ever afterward to operate in organized plants, in sentient animals, and in intelligent man. We have to choose our horn. If all the endowments now in our world were in primary molecules ready to come forth at the fit time, it is clear that they must have been the creature of an intelligence of inconceivable power. If they were not there, it is necessary to call in a subsequent creation, or at least some forthputting of Omnipotence.

Another supposition may be resorted to, somewhat more plausible, but still without any positive evidence. In water there are properties which do not appear in the elements oxygen and hydrogen. In organized matter there are powers which cannot be discovered in the components. It may be argued that in like manner at the appearances of new products there were conjunctions which produced life and feeling, consciousness and memory, intelligence and love. It may be safely said that proof is as much wanting here as in the other supposition. A necessity of thought founded on experience does indeed imply that there must be some extraordinary power called in to account for the extraordinary result which is beyond the potency of the common mundane agencies. But what this

power is we have really no means of knowing. It is certain that the power which has provided intelligence and conscience cannot be the ordinary mechanical or the chemical, or even the vital powers. These new powers imply, if not a creation, at least a providence.

The objects we are now looking at lie on the horizon of our vision and appear dim. We are constrained to call in a power to produce the effects, but whether it is to be regarded as natural or supernatural, we may not be able to say. God is working, but whether without or with secondary instrumentality we cannot determine. We may have come to a region where the difference between natural and supernatural disappears. We may have remarked that the Scriptures never mention such a distinction; they ascribe all to the will of God. The distinction may have an importance only in this lower and mundane sphere where we have worlds, but no experience of the creation of worlds. Faith and science may both be satisfied with our ascribing the whole process to a Divine Power, without dogmatizing as to how it has been acting.

Have we not, after all, the most satisfactory account of the process in the opening of our Scriptures? There is certainly a wonderful correspondence or parallelism between Genesis and geology, between the written record and the record in stone. We are to be on our guard indeed against straining either one or other to bring them into accordance. The general agreement of the two is as obvious as it is wonderful. The only difference is that the one record is sensible, while the other is scientific. The one is the account of the scene as it would have appeared to a spectator then living; the other is the conclusion drawn from careful exploration.

That there is an accordance between the Scriptures and science has been shown by the three men on this continent

who are most entitled to speak on the scientific question: Professor Dana, of Yale; Professor Dawson, of Montreal; and Dr. Guyot, of Princeton. Both testimonies give the same general account of the progression and of the order in which the powers appear. "Howbeit that was not first which is spiritual (*πνευματικόν*), but that which is natural (*ψυχικόν*), and afterward that which is spiritual." "And so it is written the first man was made a living soul; the second Adam was made a quickening spirit" (1 Cor. xv. 44–46), where we may mark the advancement from the merely living soul (*ψυχὴν ζῶσαν*) to the quickening spirit (*πνεῦμα ζωοποιοῦν*).

More particularly the book of Genesis represents the work as proceeding by *days*, which in every part of Scripture is employed to denote epochs; thus in chap. ii. 4, it is said, "In the day that the Lord God made the earth and the heavens." Regarding the days as epochs, there is a very remarkable parallelism between the order in Genesis and the order in geology, quite as much so as that between the stages in embryology and that in paleontology pointed out by Von Baer.[1] In the beginning or origin (*ἐν ἀρχῇ*) God created the heavens and the earth, and gave the original constituents their potencies which began to act. The earth was at first without form and void, with only the materials, or star dust, as Laplace's theory requires, the homogeneous state of Spencer. When the differentiation or evolution began there was in the first day light, as we might expect. In the second day came the expanse, that is, the sinking

[1] Mr. G. Romanes declares "that the order in which the flora and fauna are said by the Mosaic account to have appeared upon the earth corresponds with that which the theory of evolution requires and the evidence of geology proves" (Nature, August, 1881). Elsewhere he refers this to "traditional history." But there can be no traditional history of the production of plants and animals.

of the more solid materials and the elevation of the more ethereal. On the third day there was the separation of land and water, and plants were produced. On the fourth day the sun and moon appeared as distinct bodies, in accordance with the theory of Laplace. On the fifth day animals are brought forth—the lower creatures, tannim or swarmers, then fishes and fowls. On the sixth day the higher animals, reptiles and cattle, and as the crown of the whole, man, with qualities higher than all the other creatures, making him like unto God.

There are two accounts of the creation of man. One is in Genesis, chap. i. 26. There is council and decision: "Let us make man in our image." This applies to his soul or higher nature. The other account is in chap. ii. 7: "And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul." This is man's organic body. We have a supplement to this, Psalm cxxxix. 15, 16: "My substance was not hid from thee, when I was made in secret, and curiously wrought in the lowest parts of the earth. Thine eyes did see my substance, being yet unperfect; and in thy book all my members were written, which in continuance were fashioned, when as yet there was none of them." This passage used to be quoted by Agassiz. This is my creed as to man's bodily organism. I so far understand what is said. Man is made of the earth. There is a curious preparatory process hinted at; a process and a progression going on I know not how long, and all is the work of God, and written in God's book. I understand this, and yet I do not understand it. Socrates said of the philosophy of Heraclitus that what he understood was so good that he was sure the rest would also be good if he understood it. So I say of this passage. I so far understand it, and get glorious glimpses of a divinely ordained

process, and yet I do not understand it, for it carries me into the secret things which belong unto the Lord our God. I affirm with confidence that there is not, in geological or biological science, any truth even apparently inconsistent with his statement.

I cannot say how man's body was formed. But the Scriptures evidently speak truly when they declare that it was formed out of previously existing materials—out of the dust of the ground. They also declare that God "breathed into his nostrils the breath of life, and he became a living soul." As to his higher nature, it is said that he was made after the image of God. This must mean in knowledge of truth and in holiness. He cannot know all truth, but he knows of certain propositions, scientific and practical, that they are and must be true. He knows and appreciates the good and distinguishes between good and evil. This he does by the conscience, an essential part of his nature, represented by the tree of knowledge of good and evil. Both these qualities raise him high above the brutes, who have some discernment of things that differ, and a fear of pain and punishment, but have no idea of necessary truth or of the beauty of moral excellence. In all this there is a new power not produced by mechanical or animal agency.

SECTION VIII.

THE NEW POWERS WORKING WITH THE OLD.

We have seen that in the ages new powers are introduced—powers of life, feeling, and intelligence—whether by natural or supernatural causes we may not be able to determine, because the operation takes place in a region

where it is difficult to say what is creative and what is creature action; what is done by instruments and what without instruments—like the original creation out of nothing. When these new powers come they act upon, and they act with, the previously existing powers. The seed of the plant falls into the soil already formed, and works in it and with it. The sentient power, when animals appear, acts along with the mechanical energy in the bodily frame. It is the same when higher intelligence is introduced into animalism. The senses still work and supply information, which is received and formed into shape by the intellect. When the moral power begins to act it does not supersede the understanding, which tells us what things are, and upon this representation the conscience proceeds. These superadded powers seem to me to be all very much of the nature of seeds. They continue, and there is reciprocal action between them and their environment. They have life in them and they germinate and grow, influencing their surroundings; and being swayed by them we have joint results which could not have been produced by either agent, and a development with vastly more varied potencies and of a more marked character, the new powers mixing with the old in the offspring, as they do in the parents. When the plant appears there is an interaction of the organic and inorganic powers, and we have development, in which both are combined, the growth of the plant and in due time its decay and dissolution, but with a seed left behind. When animals with sensation and will come forth we have now a more complex aggregate, still terminating in death, but with a new life in the offspring. The organic as the higher uses the inorganic powers and turns them to its own uses. When mind interposes it acts harmoniously with matter, and the soul and body act and interact, only the mind as the higher

subordinates the other. There is like joint and reciprocal agency as the mental powers rise higher and higher. The memory proceeds on the information given by the senses, and the understanding with its judgments and reasonings, and the conscience with its moral discernment and sentiments, presuppose and proceed upon both the senses and memory. The development now goes on under the new powers, but using all the old powers, and therefore with accumulated momentum. What is gained by any species goes down to the generation following.[1]

As one of the issues the operations of nature are apt to go on in epochs, eras, or cycles. The organized causations pass through time like stage-coaches or omnibuses, which take in and give out passengers on to their journey's end. Thus, in animal life we have infancy, childhood, mature age, declining life, old age, and death. We have epochs in history, times in which there is a strong disposition to emigrate and form colonies, as when the Greeks, in the sixth century before Christ, spread themselves over many countries. We have seasons when the cry is for war among large bodies of people, ending perhaps in a demand for peace when the evils of war have been felt, and this continuing till it is needful to defend rights which are being trampled on. We have fashions not only in dress and in modes of social life, but in literature—the Byronic pe-

[1] Prof. Cope has remarked (American Naturalist, April, 1880) that the psychical powers modify and strengthen development. "In living things the powers display design, having direct reference to consciousness, to the satisfaction of pleasure and the avoidance of pains. Mind also controls structure: the evolution of mind has a corresponding effect on organism, a view which is confirmed by palæontology. The mind producing struggles of animals has led to machines for grinding, cutting, seizing, digging; for running, swimming, and flying. Man being defective as to these instruments, has been compelled to exercise caution and reflection, and has become restricted to peculiar modes of life."

riod or the Dickens period; and in art—the Raphaelites and pre-Raphaelites; in all of which, be it observed, there is a prevailing taste which continues for years. You could often tell at what age a book was written or an edifice built simply by inspecting its style and expression.

While there is an occasional degradation by reason of the want of fitting in the environment to the new life, there is upon the whole a progression. This arises mainly from the continuance of the new and higher powers introduced—say life, or intelligence, or conscience. These abide and go down by heredity, and as they act draw in, influence, and use the surroundings to produce new or higher aggregates. There results an advance upon the whole in the vegetable and animal kingdoms, in the soil, and it may be the climate. The progression is especially seen in man, with his intelligence and moral nature, which in spite of errors and sins, leads on to the employment for ends of many and varied powers, and these of a higher order. These ends are specially secured by the founding of hospitals for the diseased and the weak, and, above all, by the founding of schools and colleges for the cultivation and refining of man's higher nature; and the improvements go down by heredity from one age to another, when they raise up still nobler products.

SECTION IX.

SPIRITUAL POWERS.

We have seen that there is an advance in the powers working in our world from the inanimate on to the organic, the sentient, the instinctive, the conscious, the intelligent, and the moral. I have sometimes thought that

in nature itself I can discover anticipations (I would almost call them predictions) of something higher to come. Agassiz was fond of finding prophecies of man's noble form in the frames of the lower animals. He erred, so I think, in not allowing sufficient influence to development. Professor Owen, too, was disposed to believe that the forms of the lower creatures pointed on to man as the archetype. Some of the views of these great thinkers as well as great comparative anatomists, may be somewhat antiquated, or at least reckoned so by our extreme evolutionists. But evolution, properly understood, does not even tend to set aside those ideals which our greatest naturalists have seen, and been elevated as they looked on them. But it may be doubted whether the natural man, the mere animal man, is the true ideal; say the selfish man, the lustful man, the deceitful man, the vindictive man. Every man is in a sense a moral man; he is possessed of a conscience discerning between good and evil, "accusing or else excusing." But our moral nature denounces much that we do, and claims to do so in the name and by the authority of God. Under this God we look for a rectification. This cannot be had in the conscience, which only condemns. Our moral nature points to a law of love, but shows no way of reaching it. In these circumstances we should not be indisposed to look round and inquire whether God, in following out his plan, may not superadd, as he has ever been superadding—some remedial measure, by which his own Idea (using the phrase in the Platonic sense) may be accomplished and realized.

The Scriptures announce clearly and emphatically that there has been an interposition and addition, and this not inconsistent with the original plan, but rather carrying it out. There is a new dispensation going beyond the old and animal ones, beyond even the intellectual and the

moral into the spiritual. God, who created man in his own image, has a means of restoring that image when it was lost. We are privileged to live under the dispensation of the Spirit. There were anticipations of his work under the Old Testament, in his working on individuals to convert and sanctify them. Still such operations were only partial and anticipatory. "For the Holy Ghost was not given, because Jesus was not yet glorified." But Jesus when on earth spake of the Spirit, which they that believe on him should receive. When he had finished his work of atonement for sin, and was taken up into heaven, the disciples waited for the accomplishment of the promise, which was fulfilled when the day of Pentecost was fully come, and the Spirit was poured out from on high. This Power continues to work in the church, and will extend its influence till the Spirit of the Lord is poured on all flesh.

Development now goes on under two potencies, the natural and the spiritual. There are the old powers still working—those of sense and understanding, of reason and of conscience. These constitute the life which God breathed into man when he became a living soul. They compose the higher reason made after the likeness of God, which sin has defaced, but which is deep down in our nature beneath the incrustations covering it from the sight, but which is capable of being restored. Upon these the new and spiritual powers work. Much that takes place is the joint result of the two. The inspiration of Moses, of the prophets and apostles, did not destroy their natural character, it only sanctified and elevated them. The spirits of the prophets were subject unto them. Religion does not eradicate the natural powers, it moulds and directs them to higher ends. The man's faculties and his temperament are not changed by his becoming pious; if he was lively

before he will be lively still, if he was dull and solid he will continue so.

It should be noticed, however, that as the new powers come in there may be opposition offered by the old powers, and a contest ensues. Science tells us that in the animal ages there was "a struggle for existence and the survival of the fittest." There is a like struggle in the human period between the evil and the good. Some of our old theologians held that death was introduced among the lower animals by the sin of Adam. There is no such statement in the Scriptures, and geology shows that death has reigned all along in the animal kingdom. But there is a unity in our world in this respect as in others, that there has been a contest in all ages. In this world the seed of the serpent contends with the seed of the woman, and in the heart "the flesh lusteth against the spirit, and the spirit against the flesh." "The whole creation groaneth and travaileth together until now," but in the hope that the higher will conquer the lower, and that "the creation itself shall be delivered from the bondage of corruption into the glorious liberty of the children of God" (Rom. viii. 19).

The development goes on in eras or epochs like the ages of geology, like the days of Genesis. The patriarchal dispensation grows out of the antediluvian, the Jewish out of the patriarchal, the Christian out of the Jewish. We may discover marked epochs even in the Christian church: the time of the fathers—a time of establishing; the mediæval church—preserving like the winter the seeds deposited; the Reformation—bursting forth like the spring; the denominational churches—discussing doctrines and settling creeds; the missionary churches—carrying the truth to all lands, and about to expand into the millennial church.

Upon the whole, there is progression in the spiritual as

in the natural kingdom. Indeed many interesting correspondences may be traced between the two kingdoms. In both there are old powers and new working together and leading on to higher and higher products. The kingdom of heaven is like unto leaven, which a woman took and hid in three measures of meal, and which ferments there till the whole is leavened. It is a seed becoming a plant; there is first the blade, then the ear, and then the full corn in the ear.

There is a development in the revelation of truth. First there is the shadow and then the substance, there are first types and then the archetype. There are promises and then performances, predictions and then fulfilments. We know little of antediluvian times, but evidently there was then a light like that of the dawn. There were prefigurations in the Levitical institutions made after the pattern shown in the mount. There is higher ethical teaching in the New Testament than in the Old. The discourses of our Lord, who is the light of the world, shed a brighter light than had shone before, Greek or Jewish. There is the fullest revelation of doctrinal truth in the Epistles of Paul, of Peter, and of John.

We may discover this conjunction of powers in the writing of the Scriptures. Moses speaks, and David speaks, and Isaiah speaks, and Paul speaks, and John speaks; and we discover the natural temperament of each, and the influence of the age and circumstances in which they lived. But God too speaks: "Thus saith the Lord." All this is in analogy with God's mode of procedure. The "higher criticism," as it is called, may look at and search and even find fault with the human element, but let it beware of meddling with the Divine element. If it does so it will be seen in the end only to show its weakness and fallibility, by, it may be, casting out, though the critic may not see it,

something fitted to accomplish a good end. "All Scripture is given by inspiration of God, and is profitable for doctrine, for reproof, for correction, for instruction in righteousness, that the man of God may be perfect, thoroughly furnished unto all good works" (2 Tim. iii. 16).

Under this double influence the Christian grows. He "adds to his faith virtue; and to virtue knowledge; and to knowledge temperance; and to temperance patience; and to patience godliness; and to godliness brotherly kindness; and to brotherly kindness charity." Not that he is every instant advancing, but he is, upon the whole, progressing. He may have his periods of declension, but he rises above them. He is like a man ascending a high mountain; as he mounts up he may have to cross valleys deep and dark, but, upon the whole, he is rising higher and higher. The Christian dies like Samson, amid the glories of his strength, and slays in his death the last of his spiritual enemies. The church, too, extends. It is ever spreading into new countries, and it gives evidence that it will at last subdue all lands. Wherever it goes it carries with it innumerable blessings, in the lessening of human suffering, in improved legislation, in the promotion of education—lower and higher—and generally in the elevation of the race in knowledge and character.

Here it is interesting to notice the unity of the developed and developing history of our world. It does not take at first the form of a perfected world, but of a world going on toward perfection. It is not optimist, as Leibnitz painted it, but it is to become optimist. It has evil in it; but it is not pessimist, as Schopenhauer and von Hartmann represent it, going to the other extreme. As it is now going on it is a scene of contests, with defeats and victories through all its past history. It is a scene of contest from the beginning, of warring elements, of creatures suf-

fering who had not sinned "after the similitude of Adam's transgression." There is in it at this moment a contest between the evil and the good, like that between winter and spring, in which the spring, led on by the sun in the heavens, shall certainly prevail.

It is the most blessed of our privileges in this dispensation that every one who believes has access to God. There is a sense, indeed, in which God makes himself known to all his intelligent creatures, and "lighteth every man that cometh into the world." He does so in his ordinary providence, in which he brings events to pass according to causes which he has instituted, and in which he acts quite as certainly as if he produced everything without subordinate agency. But earnest minds have never been satisfied with such distant views of God as are given by causation and consequent evolution. They aspire after and long for immediate intercourse with God. They pray in the belief that there is one to hear them, and they expect an answer. They will not allow themselves or others to think that God has so shut himself out from his own world that he cannot act in it and on it. They deny that our petitions are so bound to the earth by gravity that they cannot mount upward and reach the ear and the heart of our Heavenly Father who is felt as pitying them. They believe that their spirits can hold communion with God, who is a spirit, quite as certainly as our earth can act on the sun, and the sun on the earth. They have faith that there are wider and closer unions than the attraction of matter to matter. They are sure that all holy intelligences throughout the universe are in union with the holy God. Sure as we speak to God in faith God hears us. He speaks if we will but hear. "Truly our fellowship is with the Father, and with his Son Jesus Christ."

From this double power, natural and spiritual, arises the

difference in Christian experience and character. People have different natural inclinations, and are beset by different sins and temptations, and he suits his manifestation to their diversities. No Christian should insist that the work of God should be the same in the heart of every other as in his own. Nor should any one doubt of the reality of a spiritual work in himself because his experience is not the same as that of some others of whom he has read, or who may have opened up their feelings to him. Just as there is a diversity in the works of nature, in the color and form of plants and animals peopling the earth and ocean; just as there is a variety in the shape and countenance of the bodily frames of men; just as one star differeth from another, so Christians, while after one model, are made to take different types and hues of beauty on earth, and shall thus with their individualities be transplanted into heaven to adorn the paradise of God, and shine as stars in the firmament in heaven. In heaven the foundations of the wall of the city are garnished with all manner of precious stones, and the tree of life in the midst of the garden bears "twelve manner of fruits," so the saints will there have each his own character; and the song which ascends will be a concert of diverse voices, each melodious, but each in its diversity joining with the others to make the harmony. Each in his own way will join in singing "the song of Moses and the Lamb."

SECTION X.

OVERSIGHTS IN SPENCER'S EVOLUTION.

It is of no use denying in our day the doctrine of evolution in the name of religion, or any other good cause. An age or two ago many religious people were afraid of geology. It can now be shown that it rather favors religion by its furnishing proofs of design, and by the wonderful parallelism between Genesis and geology. The time is at hand when all intelligent people, religious and irreligious, will perceive that there is nothing impious in development considered in itself; though it may be carried to excess and turned to atheistic purposes. The business of inquirers now is to explain its nature. This is what I have endeavored to do, to the best of my ability, in this little work. In doing this I have given an account different from that of Herbert Spencer. My work is a small one compared with his elaborate volumes. I do not purpose at the close of it to review his theory. In another number of this Series I propose examining his philosophy as culminated in his Ethics. I am here merely to show that I have set forth some truths not noticed by that powerful speculator, who is as remarkable for what he has overlooked as for what he has looked at. I think I have helped somewhat to clear up the subject by representing evolution as an organized causation. This requires us always to look for an adequate cause of the new product attributed to evolution. Mr. Spencer, and his follower Mr. Fiske, refer the whole to the Persistence of Force, as if there were only one power, and this apparently only mechanical or biological. But

there are other powers, or at least manifestations of power, of which we have as distinct evidence as we have of these. In particular there is a mental power, of which we are conscious, but at the peculiarities of which he has never looked, and which cannot be produced by any persistence of his forces.

It was charged against Locke by Liebnitz, and repeated by Cousin, that in constructing his theory—that all our ideas are derived from sensation and reflection—he did not begin with a careful introspection of the ideas themselves, and that, in fact, he overlooked the peculiarities of some of our most important ideas, such as infinity and moral good. A like charge may be brought against Spencer. As might be expected of one trained as an engineer, he is well acquainted with mechanical power, and has acquired a large knowledge of biology, some of his theories in which, however, as, for instance, his development of nervous forces, are not acknowledged by our highest authorities. But he seems to me to have never looked patiently, by the inner sense, at purely mental acts, such as consciousness, cognition, moral discernment, and will. "I believe that the experiences of utility, organized and consolidated through all past generations of the human race, have been producing corresponding nervous modifications, which, by continued transmission and accumulation, have become in us certain faculties of moral intuition." Our moral intuitions are thus nervous modifications become hereditary.

He speaks often, as even the materialist does, of psychical acts. He thinks he has accounted for them by evolution. He has done so, simply overlooking their distinctive qualities as revealed by consciousness. He tries to evolve the conscious from the unconscious, thought from that which has no thought, and the moral from that which has no morality. He has thus in the effect what is not in the

cause. If we scrutinize his theory carefully, we shall find that what he accounts for is not properly psychical or mental operation, is not the consciousness of self, is not the feeling, the emotion, the reasoning, the resolution, the sentiment disclosed to the internal sense. The mind being merely an aggregate of nerves (he seems incapable of conceiving it as anything else) he can so far account for it by evolution. But when we look on mind as perceiving, judging, discerning between good and evil, we discover that he has not explained its rise by his evolution; he is not able to derive the rational from the irrational, or the good from that which has no moral perception. The fact is, his development is merely an evolution by the physical forces, not of the mental acts, but merely of their surroundings or the environment. These forces do have a powerful influence on the internal or psychical powers, not in producing them, but in directing them in certain channels. He thus believes himself, and makes it appear to others, that he is evolving consciousness and conscience when he is merely developing their accompaniments, and has never looked at anything else. Thus with all his zeal for development, he has never noticed seriously the grand results produced when psychical, and especially moral power, is joined with physical causation.

I know full well that exclusive physicists will look down with contempt upon my insisting on giving the higher intellectual and moral powers a place in evolution. But I hold these to be realities quite as much as bodies, with their energies and the motion they produce. It is not encouraging to the highest thought to find how few of those who have produced such a revolution in biology of late years have ever been trained in colleges or otherwise to consider purely mental phenomena. I do not regard their disposition to set aside these as a proof of the comprehensiveness of their

minds, but rather of their narrowness. For myself I have carefully tried never to allow my devotion to mental science to tempt me to neglect physical and physiological facts. I claim that never in my teaching or in my writings have I set myself against any discovery in natural science which has turned out to be true. Our naturalists would be elevated if, in looking at material agencies, they did not overlook mental, moral, and spiritual powers. The full-orbed truth is discerned only by those who go round it and look at all its sides. Thus only can the mind be open to all knowledge, and become expanded in any measure corresponding to the width of the universe disclosed to us.

IV

CERTITUDE, PROVIDENCE AND PRAYER

CERTITUDE, PROVIDENCE AND PRAYER.

INTRODUCTION.

I am accustomed to characterize the age as one of unsettled opinion; certainly not one of strong faith, nor yet of avowed scepticism, but of restless creed. There is a wide-spread impression that the advance of thought, and especially of natural science, has undermined old and fundamental truths both in philosophy and religion. I am endeavoring to show in this series of papers that it is not so. Some of these truths may have to be put in a new and more correct form; the defence of them has to proceed in a wiser way; but the radical principle remains as deeply and firmly established as ever.

The doubts and difficulties issue from four quarters of the heavens, or rather of the clouds.

I. From philosophy or metaphysics. There is a growing idea that all truth is drawn from experience, that innate ideas are dead and committed to the grave, from which it would be offensive to raise them, and that their heirs and successors, *à priori* principles, are waxing old and are ready to perish. If this be so, there is left to us no universal or even positive truth, certainly no eternal or absolute truth, as the experience of the individual and of the race must be limited; it can give us only knowledge

produced by circumstances, and which may change with circumstances and vary with the position. The issue of the uncertainty is agnosticism logically, and scepticism chronologically—that is, when the causes have time to work. I have met and faced this error in No. I. of this series, and mean to give point and application to my reply in this number. I do so by a more sober account than is usually given of first, or *à priori* truths. I have to defend my position by examining historically, in future numbers, the opinions of such influential thinkers as Locke, Berkeley, Hume, Kant, and Herbert Spencer, and endeavoring to find out what truth they held, and what the errors into which they fell.

II. From natural science. It is alleged that all nature, physical and psychical, can be accounted for by cause and law and development, which are shown to prevail universally. The mistakes thus arising I have endeavored to expose in No. II. of this series, where I have sought to clear up the subject of cause; and in No. III., where I have shown that development is an organized causation having a wide field, but at the same time decided limits, and being simply a method by which God works.

III. From ethics. There is an attempt made to develop conscience and morality from experience and from heredity. It is allowed that this makes good and evil depend on circumstances, and makes it possible that the good in one world may be evil in another, and the evil in one constitution of external things be good in a different state of things. It is to be met by showing that there is a morality which does not shift, but is in the very nature of things. This subject will be taken up in this number, and will be more fully discussed in the criticism of Herbert Spencer's system as culminated in his "Ethics."

IV. From cosmogony. As the result of all these dis-

cussions there are doubts as to what is the nature of our world. Is it optimist or pessimist? the best possible or the worst possible? or neither? This brings before us Providence and Prayer, and it will be shown that this world is not the best, for it has evil, nor the worst, for it has plenteous good; it is a world not perfect, but going on toward perfection. This topic is started in this number, and will come up once and again for discussion and settlement.

SECTION I.

REALISM AND CERTAINTY.

Common people, and even thinking people, are not much inclined to speculate, or so much as to inquire, as to the actuality and certainty which they hold by. They assume certain obvious realities, and are sure that they know them, and they do not wish to be disturbed by thinking on these points, say as to their own existence or that of their mother, and are rather irritated when doubts are raised or they are subjected to questionings. But when puzzling thoughts arise, and objections are urged, and they are compelled to reflect and to speculate, they have then to face the question, is there a reality and can we find it?

The search of the Eleatics, the earliest Greek metaphysicians, was for reality—*τὸ ὄν* and *τὸ εἶναι*.[1] They saw that the popular apprehensions were often erroneous, and they

[1] The Greek phrase *τὸ ὄν* is often translated absolute in the German histories of philosophy. But absolute is rather a modern idea, stirred up by the theological belief as to infinity, and metaphysical discussions as to conditions. The Greek inquiry was after realities as distinguished from appearances.

labored to correct them by finding what things exactly are, and they came down to what is fixed and unchangeable. This was also the main aim of Plato, who sought by a subtle dialectic, and by bringing in an Idea, to reconcile the opposing systems of his day, and the fixedness of things with their changing appearances. The search, openly or correctly, has a deep place in the whole Greek philosophy, even in that of Aristotle, who did more than any other to bring down philosophy to facts, while its own region is above facts. The fault of the subtle speculators was that they dived down to the bottom of the well to find the pure water which had risen to the surface, and in doing so they stirred up mud which troubled the whole.

Modern metaphysicians have been disposed to make our conviction as to reality to be the result of a complex process, which they had to unfold. Descartes made the knowledge of self take the form, if not the reality, of reasoning: *Cogito, ergo sum.* Descartes and Locke both represent the mind as knowing and looking at an idea in the mind, or out of the mind, instead of matter itself. Berkeley, adopting this principle, showed that we have no proof of the existence of matter. Hume drove the philosophy of his day to its logical consequences, and beginning only with "impressions" and "ideas," without a thing to impress the mind, or a mind to impress, landed thinking in universal scepticism. Even Reid did not speak very decidedly about self-consciousness as perceiving self directly, and he talks of sensations "suggesting" the perception of an external world. In arguing with the sceptic Kant was unwilling to postulate too much, and he started with presentations unknown, or with phenomena in the sense of appearances, and not with things; and he could reach reality only by a process which his greatest admirers regard as unsatisfactory, and which, it is

now argued, issues logically in agnosticism. Hegel, to his credit, tried to bring back thought to reality, but it is by a dialectic process, which, as it did not begin with reality, never could reach it by legitimate logical inference, or rise higher than the subjective process.

It is time now to return to the natural method, and to avow it and justify it. In reflective as in spontaneous thought, in metaphysical philosophy as in natural thinking and conviction, we should start with existing things. Let us commence with our own existence, that is, with self as existing, always along with something affecting it. There is no intellectual or moral impulse, no felt want or desideratum of any kind requiring us to prove our own existence. We need not try to prove it. If we try, it will only be to find that we cannot; for there is nothing simpler or more evident from which to infer it. We should at the same time begin with the existence of external and material objects as affecting us. It is conceivable indeed that this step is a derivative one. It is urged by some that, knowing self, we may by a process reach a something out of self, and extended, that is, occupying space. But this process, if there be such, must be instinctive. We cannot by reasoning, or any legitimate discursive step, leap over the chasm between the self and the not self, any more than we can leap over our own shadow. We apprehend body as extended, but there is nothing in an unextended self to entitle us thence to infer an external and extended object. Just as little can this be done by a gathered experience, for when externality and extension are not in any one of the experiences we cannot find them in an accumulation of them. Altogether it is the most satisfactory hypothesis to assume the existence both of a self and an extended not self. No, it is not an hypothesis, it is a fact that we know both.

But it is objected, Do you hold, and justify yourself in holding, what cannot be proven? To this I reply that there may be two kinds of evidence, one immediate and the other mediate. When I open my eyes on a letter I know that there is a colored surface before me; I do not need evidence through anything else, for I have it in the thing itself; it is self-evident. But when I argue that this is a letter from a friend, I need mediate evidence, say in the signature attached. The mind does not insist on having indirect light, we may have direct. It is sure that the direct evidence, when it can be had, is the more satisfactory. It demands immediate proof only when it has not the other. In all cases the mediate proof proceeds in the end on an immediate proof on which it depends. There is a primitive knowledge anterior to and above mediate probation. It is so far a weakness in us that we are not able to know a thing directly, and to call in intermediate steps. We may believe that there are angelic beings who perceive things and truths at once, and without a process. We are not required to believe without evidence; but the evidence may be in the thing itself, that is, be self-evident.

But are we at liberty to appeal to assumed truths when we find it convenient, and thus render all probation and investigation unnecessary? Those who have used first principles have commonly enunciated tests—often, I admit, loosely stated. The test of necessity used by Leibnitz and Kant is the one most commonly appealed to in the present day—and it is decisive. It is the only criterion available to those who do not allow that we can perceive objects directly; but it is felt to be somewhat harsh to insist on us believing a proposition simply because we must do so. Those of us who hold that we can perceive objects directly have a prior and more satisfactory test—that of Self-Evi-

dence; we know a thing, and are thus sure that it exists. As knowing it we cannot be made to think otherwise, and thus the secondary test, Necessity. These are confirmed by the third test, that of Catholicity, when we find the truth believed by all men.

But, it is asked, If first truths be so certain, how is it that there is so much uncertainty in the metaphysics which treat of them? In order to meet this question we have to draw two distinctions, which have been very much overlooked in speculative philosophy.

First, we have to distinguish between first truths, properly so called, and other things—impressions, inferences, experiences—mixed with them. We can stand up confidently for the certainty of all original perceptions, but not for the rash reasonings upon them, or the feelings they gather around them. Our constitution, and the God who gave us our constitution, are not responsible for all the pretentious metaphysical principles which multitudes indulge in.

But there is a more important distinction. These first truths are all in the first instance singular. The child, the savage has certainly not before him general metaphysical principles, such as that it is impossible for the same thing to be and not to be at the same time. He simply knows that if a thing be here now, it cannot be elsewhere. He has not consciously before him the rule that the shortest distance between two points is a straight line; but he actually takes the straight line when he has to walk from one place to another. He is not in the way of conceiving or enunciating the law that every effect has a cause; but on noticing a new thing, or a change on an old thing, he looks for a cause. It is only the mature man, only, in fact, the metaphysician, who is at pains to generalize or formulize the individual perceptions into a general law or axiom.

In doing this he may commit a mistake. He may lay it down as an indisputable principle, that "it is impossible for the same thing to be and not to be," to find it contradicted by the fact that a tree or a man exists now, and is gone in a short time after; and so he has to add the clause, "at the same time." Some one lays down the maxim that everything has a cause, and he is immediately asked has God a cause, when he has to amend his statement, and make it everything that begins to be has a cause. The forming of the general rule out of the individual and often complex exercise of our primitive perceptions is one of the most difficult tasks in which the human intellect can be engaged, requiring the most careful observation and the sharpest subtlety to disentangle the primitive truths from its accretions. Confused statements, premature generalizations, and hasty inferences abound in speculative philosophy more than in any other branch of inquiry. Metaphysics is commonly believed to be the most dubious and perplexed of all departments of science. This is not because of any uncertainty in the principles in the mind, but because of the difficulty in apprehending and enunciating them. The remedy is to be found in insisting that those who use for any purpose a first truth, which they assume without proving, should put that truth (as is done in mathematics) in proper form and show that it is in the mind.

Upon the primitive cognitions are reared other first truths. In Primitive Cognitions the object is present. But we are quite as sure of the existence of other things not present, as, for example, our conviction of our existence in time past, and generally our convictions as to time, as that time is continuous, and that all events are in time. These constitute our Primitive Beliefs. Again, in comparing things known to us we discover at once that they agree or do not agree. These are Primitive Judgments. It is

thus we decide that we are the same persons to-day that we were yesterday; that the whole is equal to the sum of its parts; that whatever is true of a class is true of each of the members of a class; that two parallel lines cannot meet; that time flows on; that equals added to equals are equals; that a property implies a substance, and an effect a cause.

So much for first truths. But by far the greater number of the truths which we are required to believe from day to day and from hour to hour are derivative. If we follow these sufficiently far down, we find they have a foundation firm and strong in first truths. But the derivative truths constitute a superstructure raised above them, and we have to see that all the parts be secure. We have now, I believe, convenient tests of these. There is truth gained by reasoning of which we have tests in the syllogism. There are general laws, reached by gathering facts, and we have now canons determining their validity. Some of them are certain, in fact, as certain as primitive truths, though not determined by the same kind of evidence. Others are only probable, but it may be so probable as to demand our assent, as that the sun will rise to-morrow; others may be doubtful, as that the planets are inhabited. The tests we have given in Series No. I. should determine the degree of probability. I have shown that among these primitive perceptions we have that of power and cause and effect, the precise nature of the energy being determined by experience (see No. II.). I have shown that causation leads to development, and that the development in the world is an organized causation accomplishing ends (see No. III.).

But has not evolution changed all this?

SECTION II.

EVOLUTION AND CERTITUDE.

It is certain that intelligence grows. The way in which it does is an instructive illustration of the nature of development. It is within ourselves, and we can see its workings in this department more readily than in any other.

It is always to be presupposed that there is an intelligent mind with capacities; without this presupposition we cannot advance a step. It is of the nature of these capacities to work. As they do so they are acquiring, accumulating, and combining knowledge. The child gets information by direct observation, and from parents, nurses, and teachers. As the boy advances in life he is ever noticing new facts, treasuring them up in the memory; is ever reflecting on them, arranging them, and subjecting them to abstraction, generalization, and reasoning. The brain grows by the exercise of the mind; the cerebral hemispheres of the mature man are larger than those of the infant; and those of civilized men, as a whole, weigh more than those of savages. It may be allowed, I think, that the mental capacities grow with the growth of the brain, that they both grow by mutual action, and that the mind itself is strengthened and enlarged by exercise, and by increase of knowledge.

So much for the growth of the individual. Now it will surely be allowed that this growth, or development if you choose to call it, does not destroy or set aside the primary intelligence; on the contrary, it enlarges it. The child

acquires knowledge, and is ever adding to it. The later knowledge surely does not disannul the early. The growth, in fact, consists mainly in an increase of capacity to attain higher knowledge. True, the boy may be led to entertain narrow, or even erroneous opinions, but the mature man may correct them.

Herbert Spencer has been showing that not only is there a growth of the individual, but of the animal race. The attainments of one age go down by heredity to the succeeding one. The power of hunting acquired by the dog goes down to its descendants. Mr. Spencer holds that intelligence does thus go down from father or mother to son or daughter. It may be so. The brain structure determined by the habits of a parent may, by inheritance, determine a certain disposition in the children. But all this does not destroy, or even lessen, the capacity for acquiring knowledge. I can conceive a heredity that would bear down and crush all independence of thought, and place all mankind in the position of lunatics. But the actual heredity makes, or rather finds us, sane men, and increases our power of judging for ourselves.

I have in a previous number of this series endeavored to show that, if there be much that development can do, there is much that it cannot do. We see clear and decisive traces of new powers coming in among the activities in our world—of sensation appearing where there was no sensation before, of life where there was no life, of mind where there was no mind, of moral law and obligation in the human epoch, and in Christian times of spiritual discernment and sentiment. These cannot have come from the previous powers acting naturally; sensation cannot have come from that which is without feeling, consciousness from the unconscious, mind from the mindless, the spiritual from the carnal. Among these new

powers I place the primitive perceptions, intellectual and moral, which are the deepest elements of our mental nature, and proclaim and guarantee necessary and universal truth.

In whatever way these are produced, naturally or supernaturally, they are our own. The boy is evolved from the father and mother, getting from them a great many of his general characteristics, and, it may be, many even of his eccentricities; but they are now his property, or rather his nature. The eye is produced by heredity, always in the beginning by divine power; but it sees actual things just as certainly as if it were the immediate product of that power.

All our intuitions look at things with their qualities, and they do so, whatever be their heredity. We assume them, we are naturally led to do so, we are obliged to do so. They need no external proof; they have their evidence in themselves. They need no indirect proof; they have direct proof. They are corroborated every day. We may trust in them, we should trust in them, we must trust in them.

Beginning to trust in them so far as our senses are concerned, we may and must trust in our intellectual perceptions, and are sure that they discover truth. As I contemplate these two parallel lines, I discover that if prolonged as straight lines they can never meet. It is the same with our moral perceptions. As I discover that daughter toiling day and night for the sustenance and comfort of that mother, I know it to be good and commendable. When I see that son strike his father, I know it to be evil and condemnable.

There is nothing atheistic in evolution considered in its own nature and action. It is a forgotten circumstance that when Newton made his great discovery there were

persons who maintained that he was ascribing the works of God to mere natural forces—as if natural forces were not the Divine power in operation; and he had to be defended in an elaborate work by Maclaurin, the mathematician. In like manner, there are some in our day who are sensitively afraid that we must be taking from God whatever we ascribe to evolution—as if evolution were not a natural, and therefore a Divine process. We may look upon evolution as we do upon gravitation as a beneficent ordinance of God. Gravitation is a law of contemporaneous nature, binding the bodies in space. Evolution is a law of successive nature, binding events in time. The two are powerful instruments in giving a unity and consistency to the world, and in making it a system compacted and harmonious, admired by the contemplative intellect. We do not admit that evolution can generate or explain first or fundamental principles, which we perceive to be necessarily true on the bare contemplation of the objects, but it corroborates, confirms, and strengthens them, and as a preordained environment it helps their easy and spontaneous operation.

The capacities which descend are perceptions of things. Heredity does not destroy human intelligence or render it untrustworthy. Every man has a power of knowing realities, and of distinguishing between truth and error. No matter how this power may have come, it may have been handed down by father or mother, or from grandfather and grandmother, or from a long line of ancestors, but it is the man's own; he may trust in it, and he is responsible for the use of it. In whatever way the intelligence may have been produced he can trust in it when it declares, upon the evidence furnished, that such an object, say a friend, exists; that such an event, say his marriage, has happened; and that mathematical truths, such as that

all the angles of a triangle are together equal to two right angles, are certain. I am sure that there was such a man as Julius Cæsar; that there is such a city as Rome, and that the sun attracts the moon; and this, whether I did, or did not get the capacity to do so from my ancestors. A traveller sets out on a journey with a capacity to observe, and as he proceeds he is acquiring knowledge and increasing his acquisitions. The new ones do not set aside the old, they only add to them; and the addition may often clear up difficulties and correct wrong impressions, produced without evidence, as to the paths and boundaries of plain, bay, and forest. So it is with our capacities, hereditary or personal, they merely add to our powers of vision and enable us to discover further truth.

SECTION III.

EVOLUTION AND MORALITY.

Our moral power grows, just as intelligence does. Our ethical perceptions depend so far on our intelligence, as we must know what the deeds are, and what the motives of the actors, before we pronounce a sentence upon them, and this we have to do by our cognitive powers. Our moral powers thus grow with our powers of understanding. Not only so, but it may be allowed that the conscience grows by being properly exercised; it gathers by accretion, and becomes quicker in discernment. It is strengthened by the resistance it offers to evil, waxes valiant in the fight, and is made more confident and courageous by the victories it gains. As it looks to God and his law—the law of love—its vision is purified, its views are enlarged, and the sphere of duty is widened.

According to a prevalent philosophy in the present day, the conscience is a growth—a growth produced by circumstances. In other worlds our evil may be good and our good evil, or there may be no good and no evil. The idea of good thus becomes the product of position and events. This principle is implied covertly in utilitarianism. An action is good only so far as it produces pleasure, evil only so far as it leads to pain, and this depends on the surroundings. But conscience is not the product of circumstances any more than the intelligence is. Both are so far swayed by circumstances, but both have an independent power quite as much as the circumstances which sway them. I know that the opposite angles made by the intersection of two straight lines are equal to one another; and I know that charity, and sacrifice in a good cause, and speaking the truth are good, and that lying and hypocrisy are evil and only evil.

The idea of virtue being a product lies deepest down in the biological utilitarianism of Herbert Spencer. Virtue is the quality that produces pleasure, determined by a long succession of ages, and consolidated by heredity. Now it is true that our moral power grows, but it is growth from a germ. The faculty admits of improvement, but it is because it exists as a faculty. Love and justice are discerned as good in themselves—and not because of good consequences which follow from them because they are good—just as gold is seen to glitter. Ingratitude for favors and evil-speaking are seen to be evil in themselves—not because they lead to painful issues, which in fact follow because the deeds are evil—just as night is seen to be dark. Our conscience is of the nature of a perceptive power, looking at voluntary acts and perceiving them to be good or evil. We are as sure that mercy is a virtue as that the moon shines up there in the sky. We are as sure that

murder is an evil as that poison kills. It matters not whether my perceptions have descended from my father or mother; they are now mine, quite as much so as my ocular vision, which, in like manner, has come to me by inheritance. It thus appears that development cannot interfere with the certitude either of truth or moral goodness.[1]

SECTION IV.

PROVIDENCE.

I am afraid that there is a growing number of people, who, while they believe in the existence and in the goodness of God, do not see him as they ought in the arrangements which he has made for the good of his creatures. This is one of the ways in which religion is losing its hold on the minds of thinking young men, who have been trained by science to discover causation and law in every part of nature. I fear there is not the same belief in providence as our forefathers held and cherished. In the theosophies of the East a divine power was seen and acknowledged in all the activity perceived in the universe; I have to add, however, without God being separated from his works. In Greece and Rome the people saw their different gods in the varied departments of nature: Jupiter in the thunder, Neptune in the waves, and Ceres in the crops. Our Christian forefathers delighted to discover God's hand in every event, which they believed to have a meaning which they diligently sought to ascertain. This was often done presumptuously and superstitiously. People argued a purpose and an end which the God who ordered the

[1] This subject will be more fully discussed in the paper on Herbert Spencer.

occurrences never saw, and interpreted events with a favoritism toward themselves and as judgments upon others. There is now a reaction against this whole style of sentiment, and people go to the opposite extreme, and regard it as vain to seek for a meaning in any of the operations of nature. There is a temptation here, fostered by the scientific spirit of the age, which believes in law and believes in development. Those who yield to this prevalent feeling lose many valuable lessons which God is teaching, if people would but observe his ways. I believe as firmly as any man can in the universality of law, and in the prevalence of development; but I regard them as processes by which God fulfils his purposes.

There is a General Providence. God has so constituted his creatures that they have wants to be supplied, and he has made provision for supplying these. He sheds rain and sunshine upon the evil and the good. This is not effected by the mere powers of matter. These, if undirected, might work only confusion and mischief. Gravitation will pull down an imperfectly supported building upon our heads, and electricity, in the form of lightning, may destroy us on the instant. The potencies of nature, its mechanical powers, its chemical attractions, and its vital agencies are so arranged as to produce beneficent ends. But they have been so arranged, by him who formed them and acts in them, that they produce general laws which his intelligent creatures may observe, and to which they may accommodate themselves. It is seen very clearly in the revolving seasons of the year and in the periods in the life of animated beings—in their germination, their growth, their decay, and dissolution. Man can come to know these laws, and is expected to suit himself to them and take advantage of them. Nature does not provide for all our necessities without our requiring to exert ourselves;

this would tend only to produce idleness and self-consequence, with all their attendant evils. In order to get what he needs, man is obliged to be active and industrious, and being so he secures blessings, always by the providence which God has arranged so skilfully and beneficently. The great body of mankind, all indeed except atheists, are disposed to believe this, and are encouraged and comforted as they discover that the good and wise God has planned it all.

So much all people, with a few exceptions, will be inclined to see and acknowledge, and as they do so a vague feeling of reverence and love will rise up in their bosoms. But there is a deeper meaning than this in the system of nature.

There is a Special Providence. The chief of a government, the general of an army, the head of a great mercantile house have to satisfy themselves with giving general orders which may be for the good of their dependents, but they cannot anticipate every incident or provide for the case of every individual. This is because of the limited nature of their capacities and of their knowledge. But no such weakness is laid on the Omnipresent One, who is in every place; on the Omniscient One, who knows all things; and the Omnipotent, with whom nothing is impossible. Every thing that falls out is appointed by him, nothing can occur unforeseen by him, and no opposing power can thwart his will. Every man's lot, and every incident in it, large or minute, prosperous or adverse, successful or disappointing, is ordained and secured. This is the doctrine of the greatest of all teachers, and is the only one consistent with an enlarged conception of God. "A sparrow cannot fall to the ground without him." "The very hairs of our head are all numbered." This was also taught by the wisest man of the most culti-

vated people of the ancient world: Socrates delighted to see a purpose in every organ of our bodily frame, and divine power watching over him and directing him in every turn of his life. The Christian knows that his destiny throughout is ordered by One who sees the end from the beginning, and who cannot err or fall short in wisdom or goodness, and who now sends this trial to warn, arrest, and chastise, and anon bestows this gift for encouragement and comfort.

We can see a way in which God can accomplish special ends, and this in entire accordance with the prevalence of law. In order to understand this it is necessary to refer to the distinction stated briefly by Paley in the opening of his Natural Theology, expounded by Chalmers and defended by Mr. J. S. Mill: it is the distinction between the laws of matter and the collocations of matter; or, as I express it, between the powers and properties, on the one hand, and the dispositions and arrangements of matter on the other. Arrangements are evidently needed to make the properties of matter work orderly and beneficently. This is quite as certain as that there are laws or causes in nature. In the construction of a building a great many materials are brought together, and disposed according to a plan, and to enable the edifice to fulfil its end. So it is in that grand temple of nature which God has built. Its separate objects, with their properties, are so disposed that we have first a general order—a house with compartments fitted for all, constituting that general providence of which I have been speaking, such as the blessings secured by the seasons. But farther, these dispositions are so made that there is a place for each man, a provision for him, a guardianship over him, and a course for him to pursue.

By this pre-arrangement God makes blind, mechanical, chemical, and vital laws fulfil his benevolent and righteous

purposes. By this collocation rings inflexible in themselves are made flexible, and the fabric fits into the frame, covers it as a disc, and protects it as a coat of mail. The two, the general and the special providence, do not oppose or contradict each; they conspire and co-operate. There is no inconsistency, even in appearance, between God working everywhere in nature and the prevalence of physical causes and laws. God accomplishes individual ends by causes, and according to laws which he has appointed.

A stone will fall to the ground if unsupported, and this by a law which cannot be changed; but when it is falling from a high elevation, and might kill the person beneath it, another individual who is standing by turns it aside, and no injury is done. We say, and I think very properly, that all this is done by the providence of God, who gave to the stone its properties and place, and to the bystander his generous impulse.

But what are we to make of those dispensations which bring suffering and sorrow? Are we to regard them simply as casualties or fatalities? Or are we not rather to look upon them as judgments and as punishments? In seeking to answer such questions there is need of much thought and much charity. We have warnings on this subject from very high authority. One of the lessons taught by the grand dialogues in the Book of Job is that we are not to regard suffering as proving the existence of special sin. The Great Teacher warns us, "Suppose ye that these Galileans were sinners above all the Galileans because they suffered such things? I tell you nay; but except ye repent ye shall all likewise perish. Or those eighteen upon whom the tower in Siloam fell, and slew them, think ye that they were sinners above all men that dwelt at Jerusalem? I tell you nay; but except ye repent ye shall all likewise perish."

There is a meaning in the afflictions which God sends, and we should seek to find what it is. There are cases in which we should discover in them the judgments of heaven.

1. We may discover God's judgments when the evil comes as the direct consequence of sin. There is no want of charity or kindness involved when we think and declare that this weakness or disease has sprung from vice, say from intemperance or loose living. When we can prove that the sins have been committed, we may and ought to observe that cunning and deceit deprive those who are guilty of them of the confidence of their fellowmen. We cannot and should not help experiencing a feeling of satisfaction when the wicked are caught in the trap they have laid for others. In all such cases indignation is a virtue, and the expression of it tends to purify the moral atmosphere in the community. There is a simpering charity which is a positive sin when it leads us to excuse or palliate known evil. God is speaking to us in all these judgments, and we should listen and stand in awe.

This is all we are entitled to do when the judgment is seen descending on others. But when a trying dispensation, say disease or disappointment, visits ourselves we may learn further and more special lessons. In such cases we may and always should inquire reverently what is its meaning to us. As we do so, we may not be able to discover at the moment all the ends which it is intended to serve; but still we may find out some of them. In all cases we should feel that we may profit by what God sends, and this whether we are able to decide for certain that God thus intended it; the fact that God has sent it is a presumption that he has a meaning in it. From our propinquity and close access to ourselves we may find that the event has a special direction toward us which others are

not able or entitled to notice. Even in regard to others we may quietly observe, exercising charity all the while, that a cross is sent at a particular time in order to correct and restrain a weakness or an evil in the character. Thus a friend of mine much engrossed with public benevolent work, with very little time left for his family, was laid aside from his labors by a malady which compelled him to live with his children, who were greatly benefited thereby, and I saw a providence in it. We are to be cautious in interpreting such occurrences in regard to others; but we may often perceive the end to be accomplished in regard to ourselves. We are not entitled, because events are all favoring us, to allow the impression to spring up in our minds, that therefore we are the favorites of heaven. Because a course followed by us is prospering, we are not therefore to conclude that it has the approval of God. It is not God's providence, as has often been remarked, but his law which is to be the guide of life. We must see beforehand that every step we take has the approval of God; but having done so, we may notice as we advance that God is encouraging us by the aid he gives, by removing obstacles out of the way, and opening a path through difficulties and perplexities. In particular we may observe that a check is often laid upon us to keep us from entering on a path where we might be exposed to temptations which we are not able to resist. The good man, as he walks on, will see that his steps are ordered by the Lord. The aged man, in looking back on his past life may discover that God has led him in a wonderful way, such, it may be, as he did not wish, but which he now sees to be full of wisdom, turning him aside when he was entering upon a dangerous path, and opening a road for his relief when he was shut in; restraining him when he was advancing too rapidly, and stimulating him when he was

becoming slothful and discouraged. What he knows not now he will know hereafter, if not sooner, in the light of heaven.

I maintain that there is nothing in the most advanced discoveries of science to deprive any one of these consolations. The language of Bacon cannot be too frequently quoted: "It is true that a little philosophy inclineth man's mind to atheism, but depth in philosophy bringeth men's mind back to religion. For while the man looketh upon second causes scattered, it may sometimes rest in them and go no further; but when it beholdeth the chain of their confederate, and linked together, it must needs fly to Providence and Deity."

SECTION V.

PRAYER.

Here we presuppose that prayer is a duty, a duty to God and a duty to ourselves. We are constantly receiving gifts, and it is an obligation of common morality that we should thank the giver. We have his wondrous works spread out before us, and unless we sinfully restrain them our hearts will prompt to praise. We daily commit sins, and we should daily confess them. We are always dependent on him, and it is meet that we should feel and acknowledge it. That man fails in one of the very highest ends of his existence who does not rise to communion with the great and good God. Such considerations, founded on the relation in which we stand toward our creator, preserver, and governor should lead us to pray, and we should allow no objections or cavils to tempt us to neglect or give up prayer, which is as clear a duty as any other binding upon us. Prayer is, in fact, a natural im-

pulse, prompted by internal conscience and the feeling of gratitude, and called forth by the circumstances in which we are placed; and it is wrong in us, as some do, to resist it or seek to repress and crush it.

But does God hear and answer prayer? That he hears it we may argue from his omniscience. That he listens lovingly we may infer from his goodness and grace. But does he answer in the sense of granting our requests. Upon a Scotch minister, Dr. Leechman, publishing a sermon on the value of prayer as rendering the wishes it expresses more ardent and passionate, Hume remarked, "We can make use of no expression, or even thought, in prayers and entreaties which does not imply that these prayers have an influence." But there may be difficulties started as to the possibility of prayer being answered. I am not to enter into personal controversy, but the line of thought pursued in this part of my paper has reference throughout to an eminent physician in London, Sir John Richardson, who a few years ago proposed a Prayer Test, and to the objections taken by Professor Galton in his recently published "Inquiries into the Human Faculties."

The principal objection, the fundamental one, is that the laws of nature are fixed and unchangeable. The sun will rise at the appointed hour to-morrow, even though there be persons praying for certain ends of their own that he should not appear, or appear at a different hour. The tides will flow and ebb in order, even though those setting out on a voyage might wish, for their convenience and comfort, that they should not do so.

I have answered this objection in treating of Providence, of which the answer to prayer is an exemplification. God answers prayer by providence. God has arranged matter and its forces so that good purposes, small (as we reckon them) as well as great are accomplished; virtue is

encouraged, vice is restrained, and among other good ends an answer is provided to the prayer of the most obscure believer, who is thus made to feel that he has not been overlooked in the plan of the universe. From the very beginning the prayer and its answer have been bound together in the counsels of heaven and the decrees of God. To accomplish his ends and to answer prayer it is not necessary that God should change his laws, for his unchanging laws may bring what is prayed for.

At this place I may call attention to two important principles fitted to stay and satisfy the mind. First, we have to take with us the doctrine of predestination, it being always so understood as to be compatible in itself, which it is, with the essential freedom of the will and the accountability of man. Indeed the modern doctrine of the uniformity of nature is substantially the same as that of foreordination, only seen under a somewhat different aspect—the one from below and the other from above, the one secular and the other spiritual, the latter being vastly the more comforting, as it brings in the will of a good God. In the ordination of nature, in the preordination of God, the prayer and its answer are so connected that the one follows the other, and without the one there would not be the other. This is one of the providential laws perfectly consistent with physical laws, and generally executed by physical laws.

We must take along with us another pleasant and consolatory truth, God acts in all the present actings of nature as really and truly as he acted in the beginning when he set nature agoing. God is as much present in his works as he ever was, and so when prayer is answered by natural agents it is answered by God quite as much as if answered by a visible hand or an audible voice, which are human rather than divine modes of communication

and when used by God are, after all, mere physical means.

In order to explain all this, some have argued that time has no place in the apprehension of God. Some of the mediæval mystics spoke of God as an Eternal Now, and of past and the future being before him as much as the present. There is, it appears to me, a profound truth meant to be expressed in this statement. But it must not be so expressed as to make it contradict our intuitive knowledge of things. An eternal now, an eternal present, sounds very much like a contradiction. We perceive time to be a reality, that is, a thing existing. If it be so it must be known as a reality by God. But time may have quite a different relation to God to what it has to us. God is to be looked to and thought of as immediately present in his works when he made them, and now when they are acting. When man has constructed his machine he may leave it to itself to work, or rather he leaves it to God, who works in the natural agents. But God does not, and cannot from his nature, withdraw from the world and from acting in it when he has finished it. God is immanent in all his works in their first formation and in their continuance.

We need not trouble ourselves with the difficulty about God not being able to answer prayer, as everything has been fixed from the beginning. The difficulty arises from our narrow and anthropomorphic views of God. We must not transfer our weakness to the omnipotence of Deity. We must rather, in our imperfect manner, raise our conceptions to so high a sphere that God would be separated from human infirmities. God sees every existing thing at this instant. He does so every instant. Not only so, but I think he may be held as seeing every past instant and every future instant; in short, the whole past

and future. Now this may be true, I believe it is so, of his love as well as of his knowledge. His love goes forth at this instant to every one of his creatures, just as the sun's rays go forth to every point of surrounding space. All this may be inconceivable to us, as to its mode of operation, but it is surely believable. But it may be that this love goes forth not only to all now existing creatures, it may go forth to all the past of living creatures, I am inclined to think also to all the future. We have some imperfect means of conceiving it, in the experience of human love, in the love of a mother interested in the past events of her son's life, and as she follows him on to the future. But the strongest human affections are limited. Not so with the love of God. It is expressively said, "Yea, I have loved thee with an everlasting love." Of old, from everlasting, his delights have been with the children of men. I apply this to prayer. We are apt to feel when God is said to have ordained the answer in the past ages of eternity as if this were removing God to an awful distance. But when God planned the answer he did it lovingly, and having in view our need and the yearning of our hearts. When he actually sends the answer it is under a like influence, he does so lovingly. When he grants the petition it is not against his will, or because he is compelled by his own decrees, but in thorough consonance with his will, lovingly and tenderly, it may be in pity.

[1] To the objection, Why then need I pray, since the answer is ordained? the reply is so stale that I am ashamed to be obliged to repeat it. It is an objection which may be taken to every form of activity. A man is in fever. He argues that, if it be predestined whether he is to recover, it is of no use sending for the physician.

[1] A considerable portion of this paper appeared in the *Independent* a few years ago when the Prayer Test was so discussed.

The answer is known to every tyro in moral science. If God has destined that the man recover, he may also have destined that he should send for the doctor. If he declines sending for the proper aid, he may find it destined that he is not to recover. So it is with the answer to prayer. If he prays, he may find that both the prayer and the answer are foreordained. If he neglect to pray, when in duty bound, he may find himself punished by being refused the blessing. In God's providence everything is carried on by means.

There are means that produce their end by direct natural agency. When a man sows, he may expect to reap. It does not need faith to show us this; a very short sight will enable us to perceive it. But there may be other means which bring about their end by the prearrangement of God, and not by physical power. And this is discerned only by that higher vision which is called faith; not that it is without reason, but because it is founded on a deeper insight into the character and ways of God. Dr. Tyndall tells us he is arguing against prayer as "a form of physical energy" (p. 764), as "a power in physical nature." I do not know what views may be taken of prayer in the scientific circles in which Dr. Tyndall moves, but I can say that I never met a religious man who claimed such a power for prayer.

No one praying in the right spirit believes that prayer has an influence on the wind, the rain, or health. Its power is over God, who planned all things at first, and acts in the rain, the wind, and the human frame. The God who prompts every grateful, every penitent heart to pray has connected the petition and the good it brings by ties as strong, though not so visible, as those which connect industry with its reward.

The mother prays for her sick child, and it is in answer

to her prayer that our physician comes in providentially with his remedy, suited to the constitution of the child, and the patient is relieved by physical laws, which are, however, subordinated to a higher provision, which the mother may believe in, but which the physician may not, even when he is made to accomplish the end designed.

He who prays in faith is falling in with the grand arrangements or laws (if you will) of the universe quite as much as he who sows in the hope of reaping. It is true, as Luther (quoted by our author) says, that *laborâsse est orâsse*, when it is labor for the glory of God and the good of man; but it is equally true *orâsse est laborâsse* in fulfilling the purposes of heaven.

A second objection is urged. Nobody believes that it is lawful to pray for every object—that it is lawful, for example, to pray that the earth should not move round the sun. "The phenomena of the universe are ranged by people who fully believe in the efficacy of petition in two categories; a class which I shall call Number One, respecting which it is quite useless, if not presumptuous, to pray, and a class, Number Two, of events, which are the legitimate objects of prayer. Now, it is curious to observe that there is no agreement at all among religious people as to the principles on which such a classification should be made" (p. 774). But pious people have a very clear rule for deciding all such cases. They pray for things agreeable to God's will. When God's will is intimated to them, no matter how, they will not pray against it. They will still pray, but their prayer now is that the event may be for good, and they be enabled to submit to it. When the boy is sick the pious mother prays that he may recover, if it be the will of God. When he dies she prays that she may be enabled to bear the trial in meekness and patience.

He hints plainly that the class of objects for which we can pray will grow less and less, and those for which we cannot pray will become more and more numerous. "The professed believer must follow, drawn by inexorable power, in the wake of advancing science, and after hard resistance, as always giving up one point after another, and resigning event after event, to be detached from the once great class of objects to be prayed for, and admitting their title of admission into the great class of settled and ordered events, not to be influenced by human interference, and capitulating with the best grace he may when forced to surrender." I admit that in a few, a very few, cases science may tell us what the will of God is before common observation can discover it. But the only effect of this is to change the prayer, "Do this, if it be thy will," a little sooner into the prayer, "Thy will be done."

And this tendency to lessen the number of objects to be prayed for is counteracted by another tendency brought into great prominence by modern science. Does not the latest science show that, as things advance, in time they become more and more complicated, and the issue is that wise men feel more their dependence on heaven? Does not M. Comte's famous classification of the sciences proceed on the principle of the complication of phenomena, and on the circumstance that phenomena become more and more complicated as we approach nearer to man, and becoming most complicated of all in human society? Has not physiology been showing that animals, as they rise in the scale, become more and more complex in their structure? Is not society, as it advances in knowledge and refinement, becoming more and more reticulated? And the greater the complexity the more difficult to foresee events and to find out what God has fixed. The most dependent of men is

the great merchant or the great statesman, who has become involved with the trade of distant nations or the caprices of millions of human beings. Science can tell us what is and must be the tendency of a given force; but it cannot tell us what will be the result of an involved combination of forces. It can tell us where a satellite of Jupiter will be ten thousand years hence; but it cannot say whether this child will be dead or alive a day hence.

But after science has done its utmost, there will remain a vast and immeasurable domain in which, as God's will is not intimated, we may humbly make known our will, adding always, "Notwithstanding, not my will but thine be done." Dr. Tyndall treats us to a long account of religious men who have opposed science and been defeated—I may say justly defeated, as setting themselves against one way in which God makes known his will. But I could give a far longer list of men who have set themselves to oppose providence and prayer, only to find that, as Beza said, "God's word is an anvil which has worn out many a hammer."

It is urged that facts go to show that there is not an answer to prayer. It is proven that those most prayed for do not live longer than others. Kings and governors have usually had constant and numerous petitions put up in their behalf, and yet their lives are not prolonged beyond the average. Missionaries are prayed for by multitudes that they may be safely carried by sea and land to their fields of labor, and that they may there be spared for usefulness, and yet it does not appear that their voyages are more prosperous than those of others in the same circumstances or that they live to a greater age. Life insurances do not take a less premium from those who are specially prayed for than from those who are not. Looking to these things the physician proposed a Prayer Test. The patients on

one side of an hospital were to be prayed for and those on the other side were not; and then it was to be determined whether the former recovered while the others did not. This seemed very dexterous. But surely God is not thus to be mocked, and his praying people were not so silly as to be taken in by so preposterous a proposal. It is astonishing to find how ignorant many of our *savans*, deep in the science of matter, are as to moral questions and the evidence by which they are settled drawn from mind and conscience and the obvious method of providence. It is not by such an experiment that the father has to settle how he has to train his son; that the earnest youth has to determine how he should set out on the journey of life; that the statesman has to fix on measures for promoting the welfare of his country.

The very purpose of God in governing the world by general laws is to secure that his intelligent creatures may from the past anticipate the future, which they could not do, were there no regular law or if this was disturbed by constant interferences. We may be sure, then, that God will not interfere with laws or regulations which he himself has devised, so as to lessen foresight or disturb reasonable expectations. We cannot conceive that God should so order events as to help or hinder insurance companies. In answering prayer God, humanly speaking, has to look to and to weigh a great many considerations—that is, facts and reasons which would have to be considered by man in like circumstances. He has to act as wise parents have to do in granting or refusing the request of their children. In the answer to be given to his prayers every one who knows himself will leave a discretion with God. It is surely a happy thing for God's creatures that he does not grant every one of their wishes. I do not know that those who pray for kings expect them to live longer than other

men. Christians cannot consent, while they pray for some men, to bind themselves not to pray for others. They will not petulantly conclude that God does not hear or answer prayer because he has not allowed them all that they demanded. In the experience of years they will discover that God has been kind to them, even as their parents were in their childhood, in refusing them certain things which they earnestly wished to obtain.

Professor Galton thinks that if it were known that God answers prayer, insurance companies might take a lower premium from those that did pray, or were much prayed for. But every man of sense sees that the infinitely wise God could not be expected to fall in with such a mode of procedure, as it would only promote religious hypocrisy. There can be no doubt that good moral men live longer than others, but life insurance offices do not lessen their charges to suit the supposed character of the applicants; if they tried to do so they would fall into favoritism and perpetual mistakes;—they have to satisfy themselves by excluding those whose known vices might injure their health and shorten their days. We can conceive of the wise God, who sends rain to the evil as well as to the good, acting on a like principle, or rather in a sovereign way of his own, so as to prevent the evils that would arise from the indiscriminate granting of petitions.

I assume that God is all-powerful, that he is all-wise, and that he is good. I hold by these truths on good and sufficient evidence notwithstanding that there is evil in the world. But it is clear that in dealing with man as possessed of free will and as having sinned, he must act on principles (if we can so speak) different from those on which we act, and which we may not be able to comprehend. For us to allow evil, which we have power to prevent, would be wrong, except, indeed, in circumstances in which

we are not at liberty to interfere with the free will of the agent. But were God bound by any such obligation, it is clear that evil would not exist in the world. Altogether, God's ways are not, and cannot be, like our ways in all respects. Many of them, in their device and mode of execution, lie in a region altogether beyond our ken. We must believe, indeed, that in nature and kind justice with God, must be the same as justice with us. We cannot conceive that the wise and just God should act capriciously or arbitrarily, but he may, always in consistency with his character, act in a manner which we are not in a position to judge of.

What advantage, then, has the praying man? Much in every way. We pray as a duty, and it becomes pleasant. We unbosom ourselves to Him, and find that we have comfort in doing so. We confess our sins to God, and feel a relief as if we had thereby thrown off a load. We pray for the forgiveness of sins, and trust that God has delivered us from the guilt. We ask divine aid to enable us to resist the evil, and feel that we have got strength in the very act. We seek to have communion with God, and feel at times that we have succeeded. We do not address him as we would these lofty mountains and these stars which cannot reciprocate our feelings. We speak to him in the confidence that he is hearing us, and that he is speaking to us. We become like him as we look to him, as we have seen the image of heaven reflected on the bosom of a tranquil lake spread out beneath it. We pray in the certain belief that God hears us. We ask for temporal gifts so far as they may be agreeable to God's will, for our own higher good, and the good of others. We are sure that as God hears our prayers so he will answer them; but we do not dictate to Deity and prescribe to him what

the answer shall be and how it must come. We pray for what God sees we need, and are sure it will be supplied. We pray most earnestly for spiritual blessings, knowing that these will always be agreeable to the will of God. As we thus hold intercourse with God our will becomes assimilated to the divine will, and we thank him for what he withholds as well as for what he grants.

A father encourages his child to make known his wishes, and lets him know that they will be attended to. This does not imply that every one of the petitions will be granted, even those that are capricious, or which the father knows might injure his boy. He complies with the entreaties, so far as this can be done consistently with the wise regulations of his household, so far as circumstances admit, and so far as the youth's best welfare is not interfered with. It is much the same with our heavenly father when we are assured that, "if men who are evil know how to give good things to their children, much more shall our heavenly father give good things to those who ask him." The two cases, indeed, that of our heavenly father and that of an earthly father, are not identical, but they are parallel, and the earthly may throw light on the heavenly. God, in his sovereign wisdom and for our good, has laid down governmental laws, and these he cannot be expected to contravene; and much as he may yearn to grant the requests of those who pray, yet he will not do so when this might injure their best interests; he will not, for instance, give them wealth when this might make them vain and proud, or tempt them into sinful indulgences.

SECTION VI.

WHAT IS OUR WORLD?

This is a question which thinking minds have been putting and pressing from the beginning. It is one asked with intense eagerness and earnestness in these our times when science is making so many discoveries, when the heavens are opening to us new wonders, more especially as to the identity of the composition of stars and earth, and when the life and growth of plants are giving us glimpses of the inner secrets of generation and heredity. We know what the experience of man says. We know what the Scriptures say. What does science say? Do these three testimonies conflict? or are they substantially the same? We are in the heart of a profound subject which philosophers like Kant dignify with the name of Cosmology when they represent all higher and deeper thought as clustering round Theology, Anthropology, and Cosmology.

I.

When we believe that this world is the workmanship of God, all-powerful and benevolent, our first idea is that there should be nothing in it but beauty and benignity. The youth setting out on the journey through it is apt to expect to find only health and happiness, peace and prosperity, sunshine and calm, flowers and fruit, love and smiles. There are abundance of such scenes on our earth's surface, and we should feel a pleasure in beholding them; children prattling, young men and maidens romping, pure and happy homes, prosperous lives in which

character and honesty are rewarded, and contented old age living on the earnings of industry and activity. This is the life which the youthful fancy paints, and which the fond mother wishes for her son. But other aspects press on our notice whether we wish it or not. If there be blue sky over our heads, it may soon be covered with clouds big with devastating torrents. If there be lovely landscapes on the earth, there are also howling deserts and malarial marshes. There is the light of day, but quite as lengthened is the darkness of night into which the day sinks. You see promising buds and blossoms, but how many are nipped by the frosts and blown away by the wind. The youth finishes his laborious education to find himself smitten down and his attainments apparently lost. The father expects the son to help and sustain him through life, and at last to lay his head in the grave, but has instead to perform that duty to his son. That young man has to weep over the grave of one whom he expected to be his bride and his life-partner. The serpent with his slime and his sting crawls into our home, pleasant as Paradise, and we have to leave it, hurt and sorrowing. If there be high enjoyments in our world there are also temptations and sins polluting the waters and making them offensive. We have all seen the hope of his family and his friends led astray, and, as they hold down their heads in shame, they have to consign his remains to a dishonored grave. The drunken son is brought home to the house of his mother, who is thereby driven to a mad-house.

II.

It is a curious circumstance that later science seems to be exhibiting our world under the same double aspect. In my younger years *savans* enlarged admiringly, as well they

might, on the perfect order and beauty of the heavenly bodies, and of the adaptation of all things to one another, and of a good end in the plant and animal. One would have thought that the world had come forth in the fulness of perfection and as a good God might wish it. I remember that I was not altogether satisfied with the account then given of nature in college lectures and books of science. I felt as if *prima facie* it was scarcely in consonance with Scripture, and really inconsistent with our experience. Scientific men showed us order and law as universally prevalent, and did not seem to think that there was anything else. It was believed that the great French mathematicians of the end of last century and the beginning of this, had demonstrated that if this world were not interfered with, it would go on forever. Paley had shown that there was an evidently designed fitting of one organ to another in every part of the animal frame.

But I could not but observe another order of facts with a different look and expression. Everybody sees and feels, and every candid man acknowledges, that there is evil in our world as well as good. There is undoubtedly pleasure in our world, but there is also pain, and the one is quite as much a reality as the other. If there be happiness continued through years, there is also at times prolonged misery. Law certainly reigns everywhere, but it seems often to work blindly. The law of gravitation holds a building firmly on its foundation, but it is quite as ready to pull it down and murder those who are dwelling in it. The fire that warms us may raise a conflagration to wrap thousands in its flames. The elements which unite to produce our food, may combine to produce poisons. If there be pure air from heaven, there may also be malarial damps from the earth. If there be widespread health, there is also disease. You notice that mother,

to-day so happy as her eye follows that child who is playing around her; to-morrow that child is languishing on a bed of distress, and next week has to be buried out of sight. To-day this man is strong, as if he were to live for years; to-morrow he is stretched helpless on a bed of distress, with no hope of ever rising. This year there is an unbroken family—father, mother, and children—next year the children are orphans, cast upon the world's cold charity. That young man has prepared himself at school, at college, in the shop or factory, for honorable work, but is not allowed to enter upon it. If there be multitudinous life, it everywhere terminates in death.

There is a worse evil than pain, there is sin. If we do not purposely shut our eyes, we have to see it everywhere. In every age and in every country there have been wars and rumors of wars. History has consisted very much in the narrative of political strifes and bloody battles. In every great city there are sinks into which filth is constantly pouring. Even in our quietest rural districts, and our apparently happiest homes, are feuds and lusts breaking out in crimes, in slanders, fights, divorces, and murders, which startle the community. We do not need to look to distant places to discover all this, we find it close to us breaking out in ourselves in evil words and deeds; we feel it festering within us as a fever. We need not, we cannot deny it. There is pain in our world, and this is an evil; there is sin in our world, and this is a worse evil.

Later science has shown us that the worlds have been formed as they now are in the course of long ages, in which have been warring elements, convulsions with violent upheavals, with earthquakes, with volcanoes, with seas overwhelming continents, and whole races perishing because they have become unfitted to their new surroundings. There is a dissipation of energy which in the end will

break up our world, and burn it with fire. It has been shown by geology that when animals were created capable of receiving pleasure, they were also liable to suffering and death. "A struggle for existence" is the characteristic of animated life from the beginning.

All this while there are everywhere order and care. The arguments of Paley and other writers on natural theology in behalf of the existence and benevolence of God are as strong as they ever were and were thought to be by our fathers. When we look to this crowning goodness we feel as if there is something unnatural in the evils which appear in our world. It looks as if creation were unwillingly subject to them. Nature seems to rebel against the evils that are in it. "For the creation was made subject to vanity, not willingly, but by reason of him who hath subjected the same in hope." The creation is striving against the tendency to evil. If there be diseases in our world there are also remedies. Nature everywhere seeks to restore itself. If there be winters in the succession of seasons, they are followed by springs, going on to summers and autumns. If there be the deaths of the individuals, there is the continuance of the race. If there be travailing, it is in order to a birth. If there be deaths there are also resurrections. Nature is struggling, but it is in order to improvement. It is ploughing in order to sow and reap in due season. All creation is moving onward, but also upward. There is a struggle for existence, but a certainty that in the end the good will gain the victory.

III.

In all this, science seems to be coming nearer to the account given in Scripture. Take only one passage: "For the earnest expectation of the creature waiteth for

the manifestation of the sons of God. For the creature was made subject to vanity, not willingly, but by reason of him who hath subjected the same in hope. Because the creature (creation) itself also shall be delivered from the bondage of corruption into the glorious liberty of the children of God. For we know that the whole creation groaneth and travaileth in pain together until now." (Rom. viii., 19–23.) Socrates said of the philosophy of Heraclitus, "What I understand is so excellent that what I do not understand I am sure must also be excellent." I understand so much of this and other like passages, but I believe it contains depths of meaning which I cannot fathom. It opens to me glimpses of objects more remote than the stars and more glorious; of nebulæ which we may not be able to reduce, but which shine across our sky like the Milky Way with a mild lustre. There is evil, "vanity," "corruption," and "bondage," and a deep sense of the evil, "a groaning" and "travailing in pain;" but there is a "deliverance," "an earnest expectation," and "a waiting," and a "glorious liberty," and "manifestation" of restored sonship. This is the account in the Scripture of our world. I believe it to be given by inspired men. Some, indeed, may be disposed to argue that it is the product of the genius or reason of man; but if so, such views and sentiments must have come from the deepest heart of humanity, joining with experience and science to give their combined testimony as to the character of our world. Man craves for a deliverance and would fain look for a deliverance. He is conscious of the burden; he groans under it and cries for relief. The Scripture tells us who the deliverer is, and what the nature of his deliverance.

We see clearly that the work of deliverance must be a stupendous one, reaching over all creation if it is to be as wide as the evil. According to Scripture God accomplishes

it in a particular way. The deliverer says that "he must needs go up to Jerusalem and there suffer many things." When he said this Peter took him and began to rebuke him, saying, "Far be this from thee, Lord." Our rationalists take the same view. And yet there is a fitness and a propriety, in a world of suffering, that the deliverer himself should suffer. God as God cannot suffer. But he takes upon him our nature and has suffered and died. God is love and he pities us. God as God cannot have sympathy with us. But as having suffered he has a fellow-feeling with all our infirmities. So we have the very remarkable expression that even Christ himself became "perfect through suffering," not perfected thereby in spiritual excellence, for he had been perfect from all eternity in holiness, but made perfect as our mediator and as having the human susceptibility of sympathy added to his divine love.

The reconciliation has many aspects. There have been keen disputes among theologians as to the precise nature of the atonement. These spring very much from the circumstance that some look upon it exclusively under one aspect, neglecting the others. The essential feature of it seems to be that in it Christ suffers for us. If we leave out this, we are leaving out the deepest principle in the transaction. He had to say, "I have a baptism to be baptized with, and how am I straitened till it be accomplished." He "groaned in the spirit and was troubled" as he contemplated death at the grave of Lazarus. In his agony in the garden he prayed, "if it be possible let this cup pass from me;" but it was not possible for it to pass if the deliverance was to be accomplished. More mysterious still, he had to say ere he expired, "My God, my God, why hast thou forsaken me." To this earnest appeal no answer was given. These heavens continued shut and silent. "My God, my God, why hast thou forsaken me." Let us come to the foot

of the cross and give the answer. "Thou wert forsaken because of our sins. 'Surely he hath borne our griefs, and carried our sorrows: yet we did esteem him stricken, smitten of God, and afflicted. But he was wounded for our transgressions, he was bruised for our iniquities: the chastisement of our peace was upon him; and by his stripes we are healed.'"

This is the keystone of the arch. But there are other aspects which ought not to be overlooked. There is what is called the moral aspect. Herein God manifests his love, and yet upholds the integrity of his law. The sin is condemned and yet the sinner is saved. Farther, it is evident from this passage and from others that the rectification extends beyond our world. Science shows that every part of our cosmos is connected with every other. There is an attraction which binds all the bodies in one system. There are the same elements in distant stars as our earth. I move my arm, and an energy is let loose which may reach the most remote regions of space. It looks as if in like manner the restoration secured in Christ reaches over all creation. The earnest expectation of creation waiteth for the revealing or manifestation of the sons of God. The creation feels as if it should claim God as a father, and yet as if this fatherhood, through the evil, had been lost, and it looks for a restoration, for the revealing or manifestation of the sons of God. The grand reconciliation is effected by him who "made peace through the blood of his cross, by him to reconcile all things unto himself; by him, I say, whether they be things in earth, or things in heaven."

Such is our world as attested by three witnesses. All men have seen and felt the evil, and this whether they look at it seriously or not, whether they avow it or not. Some have viewed it with a growling malignity, and argued that its existence shows that there is no proof of God's ex-

istence. The ancient sceptics gloated over the disorders in our world, the earthquakes, famines, and pestilences, the failure of good men and the success of bad. As they looked at these things James Mill the father, and John Mill the son, concluded that if there be a God all-powerful and good he would not have permitted these things.

I am not here to enter on the subject of the origin of evil. In my younger years I tried once and again to solve the problem. In my later life I have given up the attempt. I have become convinced that no one has cleared up the mystery, which remains as the one dark cloud in our sky. The great German philosopher, Liebnitz, propounded a grand doctrine of optimism which asserts that this is the best possible world, and this doctrine was expounded with glowing eloquence by Bolingbroke and in terse verse by Pope. This style of sentiment prevailed in our literature for more than a century, and people did little to remove the evils in our world or to elevate the great mass of the people, many of whom sank in our great cities to the lowest depths of degradation. But in later times thinkers have been obliged to view the other aspects. Astronomy teaches the generation of worlds out of star dust. Geology tells us that death has reigned over all animated beings from the beginning. In all past ages there has been a struggle for existence. We have now pessimism, which declares that the world is the worst possible, proclaimed and defended by a few moodish men of genius, and youths are wondering at it, and finding a confirmation of it in the circumstance that they are not meeting with an encouragement suited to their merits and their opinion of themselves.

On two points I have reached assurance: one is that God is not and cannot be the author of evil, and on the other hand, that those intelligent creatures who commit sin are

themselves to blame for it. Carrying these two convictions with me I leave speculative questions with God, of whose existence and goodness I have such abundant proof.

On one other point I have reached assurance: the existence of pain is not inconsistent with the existence of love. Suffering is one of the most potent means of calling forth love. The shepherd left the ninety and nine sheep in the wilderness to go after that which was lost. There was a tenderness in the interest which the father took in his returning prodigal son beyond what he felt in the one always with him, and which led him to run out to meet him and embrace him in his arms. "There is joy in heaven among the holy angels over one sinner that repenteth." "Pure religion, and undefiled before God and the Father, is this: To visit the fatherless and widows in their affliction, and to keep himself unspotted from the world." Man may feel at times as if he were kept at an infinite distance from God; yet if he would but think of it there is an endearing element in the love of God toward sinful men not found in his love to the holy angels. There is pity: "Like as a father pitieth his children, so the Lord pitieth them that fear him." That apparent frown which we see at times on the face of God is assumed only because God has to mark his disapprobation of our conduct; his love all the while being ready to burst out. Thus it was that God was led to give up his only begotten son to suffer and to die for us. It was this affection which led the Son to leave the bosom of the Father and suffer and die on earth. The highest exercise of love which the universe discloses is the love of God—Father, Son, and Holy Spirit—toward fallen and suffering man. "Herein indeed is love." The mystery of darkness is swallowed up in the mystery of light, as we "comprehend with all saints what is the breadth, and length, and depth, and height;

and to know the love of Christ, which passeth knowledge."

IV.

There are literary and scientific men in the present day who have outgrown, as they claim, the gospel; outgrown it as the man outgrows the clothes of his childhood, as the young plant bursts from the envelope that protected it. But what have they substituted? A skeleton with the living form stript off. Nothing, absolutely nothing to give peace, and life, and assurance. Thomas Carlyle, whom all persons of literary tastes are talking about in these times, when every feature of his strong but not very lovely character is exhibited to us, used to talk of the "eternities," "the infinitudes," the "realities," "the moralities," "the idealities." Matthew Arnold speaks of "sweetness and light," and "making for righteousness," things equally empty and inane. These at best are abstractions, not filling up or satisfying the heart, as they are without a living God and a loving Saviour. A younger set of men, their true offspring, have sprung up among us, and going on in the same direction have scattered and dissipated the empty truth retained in these generalities. Those who have given up Christ find that they have to give up God, and those who have given up God find that they have no sustaining morality left them; no peace, no hope of immortality.[1] "O Father, Lord of heaven and earth, thou hast hid these things from the wise and prudent, and hast revealed them unto babes. Even so, Father, for so it seemed good in my sight."

[1] Some years ago I had a call at my house, in Ireland, by a young nobleman with whom I was at that time intimate, and who has since risen to eminence as a statesman (I mean Earl Dufferin), who introduced to me his friend Lord Ashburton. The nobleman introduced took

What, then, is the conclusion to which we have come in our cosmology? Our world is not all good on the one hand, nor is it all evil on the other. In it by the capacities we possess and the opportunities afforded we can discover truth solid and satisfactory, but in which we may fall into error if our eye be not single. It is a world in which we know only in part, but in which we get glimpses of vastly more which we do not know. It is not a world at rest, but a world in perpetual activity, every atom and every mass in rapid and unceasing motion, proceeding by conflicting forces, but all in a regulated system. There is inflexible law, in which we can trust, and to which we can accommodate ourselves to secure ends, and yet a providence whereby it is made to take care of us and supply our

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me aside and said, "You know that I have lately lost my dear wife, who was a great friend of Mr. Carlyle's, and I have applied to Mr. Carlyle to tell me what I should do to have peace, and make me what I should be. On my making this request he simply bade me read Goethe's Wilhelm Meister. I did so, and did not find anything there fitted to improve me. I went back to Mr. Carlyle, asking him what precise lesson he meant me to gather from the book, and he said 'Read Wilhelm Meister a second time.' I have done so earnestly, but I confess I am utterly unable to find any thing there to meet my anxiety, and I wish you, if you can, to explain what Mr. Carlyle could mean." I told him that I was not the man to explain Carlyle's meaning, if indeed he had any definite meaning. I told him plainly that neither Goethe nor Carlyle, though men of eminent literary genius, could supply the balm which his spirit needed; and I remarked that Goethe's work contained not a little that was sensual. I did my best to point to a better way, and to the deliverance promised and secured in the gospel. I do not know the issue, but I got an eager listener. Carlyle wished to persuade his mother, a woman of simple but devoted piety, that his advanced faith was the same as that which she held firmly, and so much to her comfort, only in a somewhat different form. But in fact the mother's faith was crushed in the form in which the son put it, when it became a skeleton, as different from the life which sustained her as the bones in our museums are from the living animal.

special wants. It is a world in which God does not hold sensible communication with his creatures, but may be approached in prayer, which he will answer in his own way. In it we have a clear view of a moral law requiring obedience, but which we have disobeyed. There is evil in it, a universal evil—it is of no use denying this—but there is the universal hope of a deliverance. There has been a fall, but there has also been a recovery. God seems to have withdrawn, but by faith in the appointed mediator we can rise to communion with him. Our world is not perfect, but there is evidence that it is going on toward perfection. In it we are in a state of probation; if we stand it, it will issue in promotion to a higher sphere. Let us properly understand our position and conform to it.

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